Pan Technical Systems, Inc.

[redacted]

Montrose, California

RE-ORDER NO. 65-792

Pan Technical Systems, Inc.

CITRUS 6-5111
CHAPMAN 5-7271

3722 PARK PLACE
MONTROSE, CALIFORNIA

17 September 1965

ELECTRONIC COMPONENT PARTS
RELIABILITY EVALUATION TEST
CERAMIC CAPACITORS
TUBULAR AND FLAT
TEST PROCEDURE No. 152.20-02

FINAL REPORT

ON

ELECTRONIC COMPONENT PARTS
RELIABILITY EVALUATION TEST
CERAMIC CAPACITORS
TUBULAR AND FLAT
TEST PROCEDURE No. 152.20-02

TO

JET PROPULSION LABORATORY

17 SPETEMBER 1965

By

Henry F. Schoemehl

on

Contract Number 951040

Job Number 450

Approved By

Howard W. Hesse, President

PAN TECHNICAL SYSTEMS, INC.

This work was performed for the Jet Propulsion Laboratory, California Institute of Technology, pursuant to a subcontract issued under Prime Contract NAS7-100 between the California Institute of Technology and the United States of America represented by the National Aeronautics and Space Administration.

CONTENTS

I. ABSTRACT

GENERAL

This report describes the tests performed and results obtained in evaluation of 10 types of Miniature Ceramic Capacitors not currently covered by Military Specifications to a series of environmental and operating stresses. All of these capacitors represent "advanced state-of-the-art" parts with respect to size vs. capacitance value. The purpose of the test is shown below:

1. To accurately determine the suitability of these types of parts for spacecraft applications.
2. To determine differences, if any, in reliability between various manufacturers, both as a function of environmental stresses and electrical and thermal stress levels.
3. To determine the validity of a Screen or Burn-In on subsequent parts performance.
4. To determine or verify the existence of temperature and voltage acceleration factors during life testing.
5. To develop, in addition to attributes data, information such as "passed" or "failed" statistical data relating to the parametric behavior of the parts throughout the test series.

The IDEP summary sheets listed as Secion II of this abstract provide an account of this test insofar as parts tested, tests performed and results obtained based upon catastrophic failures alone. In addition, the following data is presented for parametric failures, which are defined as follows:

(a) Capacitance - Initial Measurements in excess of $\pm$30% of nominal value, or a change of 15% between successive readings.

(b) Dissipation Factor - Initial Measurements in excess of 110% of a manufacturer's limit, or a change in consecutive readings of 100% or greater, or a post environmental reading of 125% of a manufacturers specification.

(c) Insulation Resistance - Initial Measurements of less than 1000 megohms, or a change greater than 1000 x between two consecutive readings or a post environmental limit of less than 10 megohms.

FAILURE CHART

	Screen	Vib-ration	Mech Shock	Therm Shock	Moist Res	Life	Total Fail	Life Only	Total
Aerovox MC605104K	0	0	0	0	0	0	0	1	1
CER CK2R104K	3	7	1	0	1	24	36	8	8
Gulton CK16M104K	1	1	0	0	0	2	4	3	3
Gulton CN05M105K	3	2	0	1	1	29	36	9	9
King KC80BW104K	1	0	0	0	1	1	3	2	2
Scionics SCM30D104K	3	5	1	0	21	56	86	10	10
EMC EK200R104K	9	3	4	2	0	15	33	6	6
Vitramon VL02BK103K	0	8	1	7	0	17	33	7	7
Vitramon VK30BX104K	0	1	0	0	0	14	15	5	5
Westcap B758BX104K	0	2	1	0	4	4	11	4	4

The above chart demonstrates definite differences between manufacturers.

The computed failure rates, based upon all life test groups ranges from .78% per 1000 hours (90% confidence) for Aerovox parts to 41% per 100 hours (90% confidence) for Scionics parts with other manufacturers falling between.

The current screening specification for these types of parts is shown to be inadequate for reliability prediction.

Complete data is developed for Temperature Coefficients of all parameters as well as values of Destructive Voltage Breakdown.

IDEF[illegible]M NO. 17-10-62 IDEP

GENERAL REPORT SUMMARY SHEET

1. COMPONENT/PART NAME PER GENERIC CODE: Capacitor, Fixed Ceramic, Lead Mount	2. PROGRAM OR WEAPON SYSTEM: Mariner
4. ORIGINATOR'S REPORT TITLE: Evaluation Test, Ceramic Capacitors, Tubular and Flat	5. ORIGINATOR'S REPORT NO.
	3. TEST COMPL. 7 30 65 (DAY MO. YR.)
	REPT. COMPL. 8 30 65
	6. TEST TYPE, ETC.: Evaluation to JPL Requirements

7. THIS TEST (SUPERSEDES) (SUPPLEMENTS) REPORT NO.: [illegible]ments 152. 20-50. 40-54

8. OUTLINE TABLE OF CONTENTS, SUMMARY, OR [illegible]ENT DESCRIPTION:

SUMMARY:

This report gives the results of testing 10 types of Tubular and Flat Ceramic Capacitors from eight manufacturers.

170 parts of each type were divided into five groups and subjected to a series of tests which were identical for each type tested. Group I testing consisted of a burn-in followed by a series of environmental exposures. Group II was subjected to the same environmental exposures but not "burned-in". Group III was used for determination of Temperature Stability and Terminal Strength. Group IV was subjected to a high voltage breakdown test. Group V was subjected only to the initial measurements and life test.

At the conclusion of the above, Groups I, II and V were combined to form a 6 cellmatic operated at two temperature and three voltage levels.

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[illegible] OF THE MATERIAL [illegible]

DEP FORM NO. 1A 9-62

REPORT SUMMARY SHEET

1 COMPONENT PART NAME PER GENERIC CODE: Capacitor, Fixed Ceramic, Lead Mount	2. PROGRAM OR WEAPON SYSTEM: Mariner
4 ORIGINATOR'S REPORT TITLE: Evaluation Test, Ceramic Capacitors, Tubular and Flat	5. ORIGINATOR'S REPORT NO.: 152.20-02
	6. TEST TYPE, ETC.: Evaluation to JPL Requirements

3	DAY	MO	YR
TEST COMPL	7	30	65
REPT COMPL	8	30	65

7 THIS TEST (SUPERSEDES) (SUPPLEMENTS) REPORT NO: Supplements 152.20.50.40-E4

ITEM	8A. PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10. VENDOR PART NO.	11. IND./GOV. STD. NO.	12 TOTAL TESTED
1	Capacitor 0.1 mfd +10% 50V Radial Lead Flat Ceramic	Aerovox	MC605104RK		170
2					
3					
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(OVER)

13. INTERNAL SPECS. ETC REQ'D TO UTILIZE REPT.	ENCL	SENT WITH REPORT NO.	14. MIL. SPECS./STDS. REFERENCED IN 15C
A JPL Test Procedure			D MIL-STD-202C
B 152.20-02			E
C			F

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED
all	Visual Inspection	X	JPL 152.20-02	Examine for Defects 3X Magnification	170	0
all	Initial Measurements	X	"	Capacitance, Dissipation Factor, Insulation Resistance	170	0 (2)
I	Screen Burn-in	X	"	168 hrs. @ 2 x Rated Voltage @ 125°C	50	0
I II	Vibration	X	"	50 - 3000 Cycles, 35g rms 3 axes, 6 sweeps/axis	100	0
I III	Shock	X	"	300 g Peak, 1 Millisecond 3 Axes, 10 Blows/ Axis	100	0
I II	Thermal Shock	X	"	-55°C to +125°C 10 Cycles	100	0
I II	Moisture Resistance	X	"	10 Cycles Method 106 MIL-STD-202 Steps 1-6	100	0
I II V	Life	X	"	2000 Hours @ 50V @ 85°C	75	0
I II V	Life	X	"	2000 Hours @ 50V @ 125°C	15	0

(OVER)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(1) Test started with 170 specimens divided into groups. Group I - 50 parts, Group II - 50 parts, Group III - 10 parts, Group IV - 10 parts, Group V - 10 parts. Except for removed failures, parts were subjected in equal quantities sequentially to the tests as shown.

(2) Failure definition is open, short or inability to sustain voltage on Life Test.

(OVER)

21. REPT NO. 152.20.50.40-E4-01CR

17. TESTED BEYOND VENDOR CATALOG SPECIFICATIONS	YES	18. VENDOR INFORMED OF TEST RESULT BY: LETTER	CY OF REPT	ORAL	19. SIGNED	20. CONTRACTOR	SUBCONTRACTOR
	X		X				Pan Technical Systems, Inc

ITEM	8A PART TYPE, SIZE, RATING, LOT, ETC	9. VENDOR	10 VENDOR PART NO	11 IND GOV STD NO	12 TOTAL TESTED
5	Radial Lead Flat Ceramic Capacitor 0.1 mfg ±10% 50V	Aerovox	MC605104RK		170
6					
7					
8					

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED	
III V	Life	X	JPL 152.20-02	2000 Hours @ 100 V @ 85°C	15	0	
	Life	X	"	2000 Hours @ 100V @ 125°C	15	0	
	Life	X	"	2000 Hours @ 200 V @ 85°C	15	0	
	Life	X	"	2000 Hours @ 200 V @ 125°C	15	0	
III	Temperature Coefficient	X	"	Capacitance, Dissipation Factor and Insulation Resistance @ -55°C to +145°C	10	0	
III	Lead Bend and Pull	X	"	5 lb. Pull followed by Bend & 5 - 360° arcs	10	0	
IV	Voltage Breakdown	X	"	Increase D. C. working Voltage to Destruction	10	10	(3)

16 SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(3) Tested to Destruction values of breakdown voltage ranged from 740 volts to 2500 volts.

21. REPT NO 152.20.50.40-F4-01C

REPORT SUMMARY SHEET

1 COMPONENT PART NAME PER GENERIC CODE: Capacitor, Fixed Ceramic, Lead Mount	2. PROGRAM OR WEAPON SYSTEM: Mariner	3 TEST COMPL: DAY 7 MO 30 YR 65	
4 ORIGINATOR'S REPORT TITLE: Evaluation Test, Ceramic Capacitors, Tubular and Flat	5. ORIGINATOR'S REPORT NO.: 152.20-02	REPT COMPL: DAY 8 MO 30 YR 65	
	6. TEST TYPE, ETC.: Evaluation to JPL Requirements		

7 THIS TEST (SUPERSEDES) (SUPPLEMENTS) REPORT NO: Supplements 152.20.50.40-E4

ITEM	8A PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10. VENDOR PART NO.	11. IND. GOV. STD. NO.	12 TOTAL TESTED
1	Radial lead flat Ceramic Capacitor 0.1 mfg ±10% 200V	Chem-Electro Research	CK2R104K		170
2					
3					
4					

(OVER)

13. INTERNAL SPECS ETC REQ'D TO UTILIZE REPT	ENCL	SENT WITH REPORT NO.	14. MIL. SPECS./STDS. REFERENCED IN 15C
A JPL Test Procedure			D MIL-STD-202C
B 152.20-02			E
C			F

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED
all	Visual Inspection	X	JPL 152.20-02	Examine for Defects 3X Magnification	170	0
all	Initial Measurements	X	"	Capacitance, Dissipation Factor, Insulation Resistance	170	0 (2)
I	Screen Burn-in	X	"	168 hrs. @ 2 x Rated Voltage @ 125°C	50	3
I II	Vibration	X	"	50 - 3000 Cycles, 35g rms 3 axes, 6 sweeps/axis	97	7
I III	Shock	X	"	300 g Peak, 1 Millisecond 3 Axes, 10 Blows/ Axis	90	1
I II	Thermal Shock	X	"	-55°C to +125°C 10 Cycles	89	0
I II	Moisture Resistance	X	"	10 Cycles Method 106 MIL-STD-202 Steps 1-6	89	1
I III V	Life	X	"	2000 Hours @ 50V @ 85°C	71	11
I III V	Life	X	"	2000 Hours @ 50V @ 125°C	15	3

(OVER)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(1) Test started with 170 specimens divided into groups. Group I - 50 parts, Group II - 50 parts, Group III - 10 parts, Group IV - 10 parts, Group V - 10 parts. Except for removed failures, parts were subjected in equal quantities sequentially to the tests as shown.

(2) Failure definition is open, short or inability to sustain voltage on Life Test.

(OVER)

21. REPT. NO. 152.20.50.40-E4-02CR

17. TESTED BEYOND VENDOR CATALOG SPECIFICATIONS	18. VENDOR INFORMED OF TEST RESULT BY: LETTER	CY OF REPT	ORAL	19. SIGNED	20. CONTRACTOR	SUBCONTRACTOR
YES X		X				Pan Technical Systems, Inc

ITEM	8A PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10. VENDOR PART NO	11 IND GOV STD NO	12 TOTAL TESTED
5	Radial lead flat Ceramic Capacitor 0.1 mfg ±10% 200V	Chem-Electro Research	CK2R104K		170
6					
7					
8					

15A ITEM B	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED	
III V	Life	X	JPL 152.20-02	2000 Hours @ 100 V @ 85°C	13	3	
	Life	X	"	2000 Hours @ 100V @ 125°C	13	2	
	Life	X	"	2000 Hours @ 200 V @ 85°C	13	5	
	Life	X	"	2000 Hours @ 200 V @ 125°C	13	0	
III	Temperature Coefficient	X	"	Capacitance, Dissipation Factor and Insulation Resistance @ -55°C to +145°C	10	0	
III	Lead Bend and Pull	X	"	5 lb. Pull followed by Bend & 5 - 360° arcs	10	0	
IV	Voltage Breakdown	X	"	Increase D. C. working Voltage to Destruction	10	10	(3)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(3) Tested to Destruction values of breakdown voltage ranged from 940volts to 1370 volts.

21. REPT. NO 152.20.50.40-E4-02CH

REPORT SUMMARY SHEET

1 COMPONENT PART NAME PER GENERIC CODE	2 PROGRAM OR WEAPON SYSTEM	3	DAY	MO	YR
Capacitor, Fixed Ceramic, Lead Mount	Mariner	TEST COMPL	7	30	65
4 ORIGINATOR'S REPORT TITLE	5 ORIGINATOR'S REPORT NO.	REPT COMPL	8	30	65
Evaluation Test, Ceramic Capacitors, Tubular and Flat	152.20-02				
	6 TEST TYPE, ETC. Evaluation to JPL Requirements				

7 THIS TEST (SUPERSEDES) (SUPPLEMENTS) REPORT NO: Supplements 152.20.50.40-E4

ITEM	8A PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10. VENDOR PART NO.	11. IND. GOV. STD. NO.	12 TOTAL TESTED
1	Radial Lead Flat Ceramic Capacitor 0.1 mfg ±10% 50V	Gulton	CK16M104K		170
2					
3					
4					

(OVER)

13. INTERNAL SPECS. ETC. REQ'D TO UTILIZE REPT.	ENCL	SENT WITH REPORT NO.	14. MIL. SPECS. STDS. REFERENCED IN 15C
A JPL Test Procedure 152.20-02			D MIL-STD-202C
B			E
C			F

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED
all	Visual Inspection	X	JPL 152.20-02	Examine for Defects 3X Magnification	170	0
all	Initial Measurements	X	"	Capacitance, Dissipation Factor, Insulation Resistance	170	1 (2)
I	Screen Burn-in	X	"	168 hrs. @ 2 x Rated Voltage @ 125°C	49	0
I II	Vibration	X	"	50 - 3000 Cycles, 35g rms 3 axes, 6 sweeps/axis	99	1
I III	Shock	X	"	300 g Peak, 1 Millisecond 3 Axes, 10 Blows/ Axis	98	1
I II	Thermal Shock	X	"	-55°C to +125°C 10 Cycles	97	0
I II	Moisture Resistance	X	"	10 Cycles Method 106 MIL-STD-202 Steps 1-6	97	0
I II V	Life	X	"	2000 Hours @ 50V @ 85°C	74	0
I III V	Life	X	"	2000 Hours @ 50V @ 125°C	14	2

(OVER)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(1) Test started with 170 specimens divided into groups. Group I - 50 parts, Group II - 50 parts, Group III - 10 parts, Group IV - 10 parts, Group V - 10 parts. Except for removed failures, parts were subjected in equal quantities sequentially to the tests as shown.

(2) Failure definition is open, short or inability to sustain voltage on Life Test.

(OVER)

17 TESTED BEYOND VENDOR CATALOG SPECIFICATIONS	YES	18 VENDOR INFORMED OF TEST RESULT BY: LETTER	CY OF REPT	ORAL	19 SIGNED	20 CONTRACTOR	SUBCONTRACTOR
	X		X				Pan Technical Systems, Inc

21. REPT. NO. 152.20.50.40-E4-03CR

Item	8A PART TYPE, SIZE, RATING, LOT, ETC	9 VENDOR	10 VENDOR PART NO	11 IND GOV STD NO	12 TOTAL TESTED
5	Radial Lead Flat Ceramic Capacitors	Gulton	CK16M104K		170
6					
7					
8					

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED	
III V	Life	X	JPL 152. 20-02	2000 Hours @ 100 V @ 85°C	14	0	
	Life	X	"	2000 Hours @ 100V @ 125°C	15	0	
	Life	X	"	2000 Hours @ 200 V @ 85°C	15	0	
	Life	X	"	2000 Hours @ 200 V @ 125°C	15	0	
III	Temperature Coefficient	X	"	Capacitance, Dissipation Factor and Insulation Resistance @ -55°C to +145°C	10	0	
III	Lead Bend and Pull	X	"	5 lb. Pull followed by Bend & 5 - 360° arcs	10	0	
IV	Voltage Breakdown	X	"	Increase D. C. working Voltage to Destruction	10	10	(3)

16 SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(3) Tested to Destruction values of breakdown voltage ranged from 760 volts to 1260 volts.

21 REPT NO 152. 20. 50. 40-E4-03CH

REPORT SUMMARY SHEET

1 COMPONENT PART NAME PER GENERIC CODE: Capacitor, Fixed Ceramic, Lead Mount	2 PROGRAM OR WEAPON SYSTEM: Mariner
4 ORIGINATOR'S REPORT TITLE: Evaluation Test, Ceramic Capacitors, Tubular and Flat	5 ORIGINATOR'S REPORT NO: 152.20-02
	3 TEST COMPL: DAY 7 MO 30 YR 65
	REPT COMPL: DAY 8 MO 30 YR 65
	6 TEST TYPE, ETC: Evaluation to JPL Requirements

7 THIS TEST (SUPERSEDES) (SUPPLEMENTS) REPORT NO: Supplements 152.20-50.40-E4

ITEM	8A PART TYPE, SIZE, RATING, LOT, ETC	9 VENDOR	10 VENDOR PART NO	11 IND GOV STD NO	12 TOTAL TESTED
1	Axial Lead Flat Ceramic Capacitor 1.0 mfd ±10% 100V	Gulton	CN05M105K		170
2					
3					
4					

(OVER)

	13 INTERNAL SPECS ETC REQ'D TO UTILIZE REPT	ENCL	SENT WITH REPORT NO		14 MIL SPECS /STDS REFERENCED IN 15C
A	JPL Test Procedure 152.20-02			D	MIL-STD-202C
B				E	
C				F	

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED
all	Visual Inspection	X	JPL 152.20-02	Examine for Defects 3X Magnification	170	0
all	Initial Measurements	X	"	Capacitance, Dissipation Factor, Insulation Resistance	170	2 (2)
I	Screen Burn-in	X	"	168 hrs. @ 2 x Rated Voltage @ 125°C	50	3
I II	Vibration	X	"	50 - 3000 Cycles, 35g rms 3 axes, 6 sweeps/axis	97	2
I III	Shock	X	"	300 g Peak, 1 Millisecond 3 Axes, 10 Blows/ Axis	95	0
I II	Thermal Shock	X	"	-55°C to +125°C 10 Cycles	95	1
I II	Moisture Resistance	X	"	10 Cycles Method 106 MIL-STD-202 Steps 1-6	94	1
I II V	Life	X	"	2000 Hours @ 50V @ 85°C	71	9
I II V	Life	X	"	2000 Hours @ 50V @ 125°C	14	3

(OVER)

16 SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(1) Test started with 170 specimens divided into groups. Group I - 50 parts, Group II - 50 parts, Group III - 10 parts, Group IV - 10 parts, Group V - 10 parts. Except for removed failures, parts were subjected in equal quantities sequentially to the tests as shown.

(2) Failure definition is open, short or inability to sustain voltage on Life Test.

(OVER)

21 REPT NO 152.20.50.40-E4-04CR

17 TESTED BEYOND VENDOR CATALOG SPECIFICATIONS	18 VENDOR INFORMED OF TEST RESULT BY: LETTER	CY OF REPT	ORAL	19 SIGNED	20 CONTRACTOR	SUBCONTRACTOR
YES X		X				Pan Technical Systems, Inc

ITEM	8A PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10. VENDOR PART NO	11 IND GOV STD NO	12 TOTAL TESTED
5	Axial Lead Flat Ceramic Capacitor 1.0 mfd ±10% 100V	Gulton	CN05M105K		170
6					
7					
8					

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED	
III V	Life	X	JPL 152.20-02	2000 Hours @ 100 V @ 85°C	13	0	
	Life	X	"	2000 Hours @ 100V @ 125°C	13	3	
	Life	X	"	2000 Hours @ 200 V @ 85°C	15	6	
	Life	X	"	2000 Hours @ 200 V @ 125°C	15	8	
III	Temperature Coefficient	X	"	Capacitance, Dissipation Factor and Insulation Resistance @ -55°C to +145°C	10	0	
III	Lead Bend and Pull	X	"	5 lb. Pull followed by Bend & 5 - 360° arcs	10	0	
IV	Voltage Breakdown	X	"	Increase D. C. working Voltage to Destruction	10	10	(3)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(3) Tested to Destruction values of breakdown voltage ranged from 270 volts to 620 volts.

21 REPT NO 152.20.50.40-E4-04CR

REPORT SUMMARY SHEET

1 COMPONENT PART NAME PER GENERIC CODE	2 PROGRAM OR WEAPON SYSTEM	3	DAY	MO	YR
Capacitor, Fixed Ceramic, Lead Mount	Mariner	TEST COMPL	7	30	65
4 ORIGINATOR'S REPORT TITLE	5 ORIGINATOR'S REPORT NO	REPT COMPL	8	30	65
Evaluation Test, Ceramic Capacitors, Tubular and Flat	152.20-02				
	6 TEST TYPE, ETC				
	Evaluation to JPL Requirements				

7 THIS TEST (SUPERSEDES) (SUPPLEMENTS) REPORT NO: Supplements 152.20-50.40-E4

ITEM	8A PART TYPE, SIZE, RATING, LOT, ETC	9 VENDOR	10 VENDOR PART NO	11 IND GOV STD NO	12 TOTAL TESTED
1	Radial Lead Flat Ceramic Capacitor 0.1 mfd ±20% 50V	King Electronics	KC80BW104K		170
2					
3					
4					

(OVER)

13 INTERNAL SPECS ETC REQ'D TO UTILIZE REPT	ENCL	SENT WITH REPORT NO	14 MIL-SPECS, STDS REFERENCED IN ISC
A JPL Test Procedure 152.20-02			D MIL-STD-202C
B			E
C			F

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED
all	Visual Inspection	X	JPL 152.20-02	Examine for Defects 3X Magnification	170	0
all	Initial Measurements	X	"	Capacitance, Dissipation Factor, Insulation Resistance	170	0 (2)
I	Screen Burn-in	X	"	168 hrs. @ 2 x Rated Voltage @ 125°C	50	1
I II	Vibration	X	"	50 - 3000 Cycles, 35g rms 3 axes, 6 sweeps/axis	99	0
I II	Shock	X	"	300 g Peak, 1 Millisecond 3 Axes, 10 Blows/ Axis	99	0
I II	Thermal Shock	X	"	-55°C to +125°C 10 Cycles	99	0
I II	Moisture Resistance	X	"	10 Cycles Method 106 MIL-STD-202 Steps 1-6	99	1
I II V	Life	X	"	2000 Hours @ 50V @ 85°C	73	0
I II V	Life	X	"	2000 Hours @ 50V @ 125°C	15	0

(OVER)

16 SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(1) Test started with 170 specimens divided into groups. Group I - 50 parts, Group II - 50 parts, Group III - 10 parts, Group IV - 10 parts, Group V - 10 parts. Except for removed failures, parts were subjected in equal quantities sequentially to the tests as shown.

(2) Failure definition is open, short or inability to sustain voltage on Life Test.

(OVER)

17 TESTED BEYOND VENDOR CATALOG SPECIFICATIONS	18 VENDOR INFORMED OF TEST RESULT BY: LETTER / CY OF REPT / ORAL	19 SIGNED	20 CONTRACTOR	SUBCONTRACTOR
YES X	X			Pan Technical Systems, Inc

21 REPT NO 152.20-50.40-E4-05CR

ITEM	8A PART TYPE, SIZE, RATING, LOT, ETC	9 VENDOR	10 VENDOR PART NO	11 IND GOV STD NO	12 TOTAL TESTED
5	Radial Lead Flat Ceramic Capacitors 0.1 mfd ±20% 50V	King Electronics	KC80BW104K		170
6					
7					
8					

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED	
III V	Life	X	JPL 152.20-02	2000 Hours @ 100 V @ 85°C	15	0	
	Life	X	"	2000 Hours @ 100V @ 125°C	15	0	
	Life	X	"	2000 Hours @ 200 V @ 85°C	15	0	
	Life	X	"	2000 Hours @ 200 V @ 125°C	15	1	
III	Temperature Coefficient	X	"	Capacitance, Dissipation Factor and Insulation Resistance @ -55°C to +145°C	10	0	
III	Lead Bend and Pull	X	"	5 lb. Pull followed by Bend & 5 - 360° arcs	10	0	
IV	Voltage Breakdown	X	"	Increase D. C. working Voltage to Destruction	10	10	(3)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(3) Tested to Destruction values of breakdown voltage ranged from 580volts to 1300 volts.

21 REPT NO. 152.20.50.40-E4-05CR

GEP FORM NO. 1A 9-62

REPORT SUMMARY SHEET

1 COMPONENT PART NAME PER GENERIC CODE	2. PROGRAM OR WEAPON SYSTEM	3	DAY	MO	YR
Capacitor, Fixed Ceramic, Lead Mount	Mariner	TEST COMPL	7	30	65
4 ORIGINATOR'S REPORT TITLE	5. ORIGINATOR'S REPORT NO.	REPT. COMPL	8	30	65
Evaluation Test, Ceramic Capacitors, Tubular and Flat	152.20-02				
	6. TEST TYPE, ETC.				
	Evaluation to JPL Requirements				

7 THIS TEST (SUPERSEDES) (SUPPLEMENTS) REPORT NO: Supplements 152.20.50.40-E4

ITEM	8A. PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10. VENDOR PART NO.	11. IND. GOV. STD. NO.	12 TOTAL TESTED
1	Axial Lead Flat Ceramic Capacitor 0.1 mfd ±10% 50V	Scionics	SCM30D104K		170
2					
3					
4					

(OVER)

13. INTERNAL SPECS. ETC REQ'D TO UTILIZE REPT.	ENCL	SENT WITH REPORT NO.	14. MIL. SPECS./STDS. REFERENCED IN 15C
A JPL Test Procedure			D MIL-STD-202C
B 152.20-02			E
C			F

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO. TESTED	G NO. FAILED
all	Visual Inspection	X	JPL 152.20-02	Examihe for Defects 3X Magnification	170	0
all	Initial Measurements	X	"	Capacitance, Dissipation Factor, Insulation Resistance	170	0 (2)
I	Screen Burn-in	X	"	168 hrs. @ 2 x Rated Voltage @ 125°C	50	3
I II	Vibration	X	"	50 - 3000 Cycles, 35g rms 3 axes, 6 sweeps/axis	97	5
I III	Shock	X	"	300 g Peak, 1 Millisecond 3 Axes, 10 Blows/ Axis	92	1
I II	Thermal Shock	X	"	-55°C to +125°C 10 Cycles	91	0
I II	Moisture Resistance	X	"	10 Cycles Method 106 MIL-STD-202 Steps 1-6	91	21
I II V	Life	X	"	2000 Hours @ 50V @ 85°C	50	12
I II V	Life	X	"	2000 Hours @ 50V @ 125°C	13	10

(OVER)

16 SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(1) Test started with 170 specimens divided into groups. Group I - 50 parts, Group II - 50 parts, Group III - 10 parts, Group IV - 10 parts, Group V - 10 parts. Except for removed failures, parts were subjected in equal quantities sequentially to the tests as shown.

(2) Failure definition is open, short or inability to sustain voltage on Life Test.

(OVER)

21. REPT. NO. 152.20.50.40-E4-06CR

17 TESTED BEYOND VENDOR CATALOG SPECIFICATIONS YES	18. VENDOR INFORMED OF TEST RESULT BY: LETTER	CY OF REPT	ORAL	19. SIGNED	20. CONTRACTOR	SUBCONTRACTOR
X		X				Pan Technical Systems, Inc

ITEM	8A PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10. VENDOR PART NO	11. IND./GOV. STD NO	12 TOTAL TESTED
5	Axial Lead Flat Ceramic Capacitor 0.1 mfd ±10% 50V	Scionics	SCM30D104K		170
6					
7					
8					

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO. TESTED	G NO. FAILED	
III V	Life	X	JPL 152.20-02	2000 Hours @ 100 V @ 85°C	14	7	
	Life	X	"	2000 Hours @ 100V @ 125°C	13	11	
	Life	X	"	2000 Hours @ 200 V @ 85°C	15	14	
	Life	X	"	2000 Hours @ 200 V @ 125°C	15	2	
III	Temperature Coefficient	X	"	Capacitance, Dissipation Factor and Insulation Resistance @ -55°C to +145°C	10	0	
III	Lead Bend and Pull	X	"	5 lb. Pull followed by Bend & 5 - 360° arcs	10	0	
IV	Voltage Breakdown	X	"	Increase D. C. working Voltage to Destruction	10	10	(3)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(3) Tested to Destruction values of breakdown voltage ranged from 420 volts to 1050 volts.

21. REPT. NO 152.20.50.40-E4-06CR

REPORT SUMMARY SHEET

1 COMPONENT PART NAME PER GENERIC CODE
Capacitor, Fixed Ceramic, Lead Mount

2 PROGRAM OR WEAPON SYSTEM
Mariner

3 TEST COMPL DATE: 7 30 65
REPT COMPL DATE: 8 30 65

4 ORIGINATOR'S REPORT TITLE
Evaluation Test, Ceramic Capacitors, Tubular and Flat

5 ORIGINATOR'S REPORT NO
152.20-02

6 TEST TYPE, ETC
Evaluation to JPL Requirements

7 THIS TEST SUPERSEDES, SUPPLEMENTS) REPORT NO: Supplements 152.20.50.40-E4

ITEM	8A PART TYPE, SIZE, RATING, LOT, ETC	9 VENDOR	10 VENDOR PART NO	11 MIL STD NO	TOTAL TESTED
1	Radial Lead Flat Ceramic Capacitor 0.1 mfd ±10% 200V	Electro Materials Corp.	EK200R104K		170
2					
3					
4					

(OVER)

12 INTERNAL SPECS ETC REQ'D TO UTILIZE REPT

	ENCL	SENT WITH REPORT NO
A	JPL Test Procedure 152.20-02	
B		
C		

14 MIL SPECS, STDS REFERENCED IN ISC

D	MIL-STD-202C
E	
F	

ISA ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC PARAGRAPH METHOD/CONDITION	E TEST LEVELS, DURATION, & OTHER DETAILS	F	G
all	Visual Inspection	X	JPL 152.20-02	Examine for Defects 3X Magnification	170	0
all	Initial Measurements	X	"	Capacitance, Dissipation Factor, Insulation Resistance	170	0
I	Screen Burn-in	X	"	168 hrs. @ 2 x Rated Voltage @ 125°C	50	9
I II	Vibration	X	"	50 - 3000 Cycles, 35g rms 3 axes 6 sweeps axis	91	3
I II	Shock	X	"	300 g Peak, 1 Millisecond 3 Axes, 10 Blows Axis	88	4
I II	Thermal Shock	X	"	-55°C to +125°C 10 Cycles	84	2
I II	Moisture Resistance	X	"	10 Cycles Method 106 MIL-STD-202 Steps 1-6	82	0
I II V	Life	X	"	2000 Hours @ 50V @ 85°C	67	7
I II V	Life	X	"	2000 Hours @ 50V @ 125°C	12	2

(OVER)

(2)

16 SUMMARY OF REPORT NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN

(1) Test started with 170 specimens divided into groups. Group I - 50 parts, Group II - 50 parts, Group III - 10 parts, Group IV - 10 parts, Group V - 10 parts. Except for removed failures, parts were subjected in equal quantities sequentially to the tests as shown.

(2) Failure definition is open, short or inability to sustain voltage on Life Test.

21 REPT NO 152.20.50.40-E4-07CR

(OVER)

17 TESTED BEYOND VENDOR CATALOG SPECIFICATIONS	YES	18 VENDOR INFORMED OF TEST RESULT BY: LETTER	CY OF REPT	ORAL	19 SIGNED	20 CONTRACTOR / SUBCONTRACTOR
	X		X			Pan Technical Systems, Inc.

Item	8A. PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10. VENDOR PART NO	11. IND./GOV. STD NO	12 TOTAL TESTED
5	Radial Lead Flat Ceramic Capacitor 0.1 mfd ±10% 200 V	Electro Materials Corp.	EK200R104K		170
6					
7					
8					

15A Item	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED
III V	Life	X	JPL 152.20-02	2000 Hours @ 100 V @ 85°C	14	2
	Life	X	"	2000 Hours @ 100V @ 125°C	12	0
	Life	X	"	2000 Hours @ 200 V @ 85°C	15	2
	Life	X	"	2000 Hours @ 200 V @ 125°C	12	2
III	Temperature Coefficient	X	"	Capacitance, Dissipation Factor and Insulation Resistance @ -55°C to +145°C	10	0
III	Lead Bend and Pull	X	"	5 lb. Pull followed by Bend & 5 - 360° arcs	10	0
I J	Voltage Breakdown	X	"	Increase D.C. working Voltage to Destruction	10	10 (3

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(3) Tested to Destruction values of breakdown voltage ranged from 820volts to 1200 volts.

21. REPT. NO: 152.20.50.40-E4-07C

REPORT SUMMARY SHEET

1 COMPONENT PART NAME PER GENERIC CODE: Capacitor, Fixed Ceramic, Lead Mount

2. PROGRAM OR WEAPON SYSTEM: Mariner

5. ORIGINATOR'S REPORT NO: 152.20-02

3. | | DAY | MO | YR |
|---|---|---|---|
| TEST COMPL | 7 | 30 | 65 |
| REPT COMPL | 8 | 30 | 65 |

4 ORIGINATOR'S REPORT TITLE: Evaluation Test, Ceramic Capacitors, Tubular and Flat

6. TEST TYPE, ETC: Evaluation to JPL Requirements

7 THIS TEST (SUPERSEDES) (SUPPLEMENTS) REPORT NO: Supplements 152.20.50.40-E4

ITEM	8A PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10 VENDOR PART NO.	11. IND. GOV. STD NO.	12 TOTAL TESTED
1	Radial Lead Tubular Ceramic Capacitor 0.01 mfd ±10% 100V	Vitramon	VL02BK103K V-LAM		170
2					
3					
4					

(OVER)

13 INTERNAL SPECS ETC REQ'D TO UTILIZE REPT	ENCL	SENT WITH REPORT NO.	14. MIL SPECS, STDS REFERENCED IN 15C
A JPL Test Procedure			D MIL-STD-202C
B 152.20-02			E
C			F

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED
all	Visual Inspection	X	JPL 152.20-02	Examine for Defects 3X Magnification	170	0
all	Initial Measurements	X	"	Capacitance, Dissipation Factor, Insulation Resistance	170	0 (2)
I	Screen Burn-in	X	"	168 hrs. @ 2 x Rated Voltage @ 125°C	50	0
I II	Vibration	X	"	50 - 3000 Cycles, 35g rms 3 axes, 6 sweeps/axis	100	8
I III	Shock	X	"	300 g Peak, 1 Millisecond 3 Axes, 10 Blows/ Axis	92	1
I II	Thermal Shock	X	"	-55°C to +125°C 10 Cycles	91	7
I III	Moisture Resistance	X	"	10 Cycles Method 106 MIL-STD-202 Steps 1-6	84	0
I II V	Life	X	"	2000 Hours @ 50V @ 85°C	69	13
I II V	Life	X	"	2000 Hours @ 50V @ 125°C	14	1

(OVER)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(1) Test started with 170 specimens divided into groups. Group I - 50 parts, Group II - 50 parts, Group III - 10 parts, Group IV - 10 parts, Group V - 10 parts. Except for removed failures, parts were subjected in equal quantities sequentially to the tests as shown.

(2) Failure definition is open, short or inability to sustain voltage on Life Test.

(OVER)

21. REPT. NO. 152.20.50.40-E4-08CR

17 TESTED BEYOND VENDOR CATALOG SPECIFICATIONS	YES	18 VENDOR INFORMED OF TEST RESULT BY: LETTER	CY OF REPT	ORAL	19. SIGNED	20 CONTRACTOR	SUBCONTRACTOR
	X		X				Pan Technical Systems, Inc

Item	8A PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10. VENDOR PART NO	11. IND./GOV. STD NO	12 TOTAL TESTED
5	Radial Lead Tubular Ceramic Capacitor 0.01 mfd ±10% 100V	Vitramon	VL02BK103K V-LAM		170
6					
7					
8					

15A Item	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED	
III V	Life	X	JPL 152.20-02	2000 Hours @ 100 V @ 85°C	12	1	
	Life	X	"	2000 Hours @ 100V @ 125°C	14	1	
	Life	X	"	2000 Hours @ 200 V @ 85°C	14	0	
	Life	X	"	2000 Hours @ 200 V @ 125°C	11	1	
III	Temperature Coefficient	X	"	Capacitance, Dissipation Factor and Insulation Resistance @ -55°C to +145°C	10	0	
III	Lead Bend and Pull	X	"	5 lb. Pull followed by Bend & 5 - 360° arcs	10	0	
IV	Voltage Breakdown	X	"	Increase D.C. working Voltage to Destruction	10	10	(3)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(3) Tested to Destruction values of breakdown voltage ranged from 1800 volts to 3600 volts.

21. REPT. NO. 152.20.50.40-E4-08CR

JCP FORM NO. 1A 9-62 JPL

REPORT SUMMARY SHEET

1. COMPONENT PART NAME PER GENERIC CODE	Capacitor, Fixed Ceramic, Lead Mount
2. PROGRAM OR WEAPON SYSTEM	Mariner
3. TEST COMPL (DAY / MO / YR)	7 / 30 / 65
5. ORIGINATOR'S REPORT NO.	152.20-02
REPT. COMPL (DAY / MO / YR)	8 / 30 / 65
4. ORIGINATOR'S REPORT TITLE	Evaluation Test, Ceramic Capacitors, Tubular and Flat
6. TEST TYPE, ETC.	Evaluation to JPL Requirements

7. THIS TEST (SUPERSEDES) (SUPPLEMENTS) REPORT NO: Supplements 152.20.50.40-E4

ITEM	8A. PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10. VENDOR PART NO.	11. IND. GOV. STD. NO.	12. TOTAL TESTED
1	Radial Lead Flat Ceramic Capacitor 0.1 mfd ±10% 50V	Vitramon	VK30BX104K		170
2					
3					
4					

(OVER)

	13. INTERNAL SPECS. ETC REQ'D TO UTILIZE REPT.	ENCL	SENT WITH REPORT NO.	14. MIL. SPECS./STDS. REFERENCED IN 15C
A	JPL Test Procedure			
B	152.20-02			D MIL-STD-202C
C				E
				F

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO. TESTED	G NO. FAILED
all	Visual Inspection	X	JPL 152.20-02	Examine for Defects 3X Magnification	170	0
all	Initial Measurements	X	"	Capacitance, Dissipation Factor, Insulation Resistance	170	0 (2)
I	Screen Burn-in	X	"	168 hrs. @ 2 x Rated Voltage @ 125°C	50	0
I II	Vibration	X	"	50 - 3000 Cycles, 35g rms 3 axes, 6 sweeps/axis	100	1
I III	Shock	X	"	300 g Peak, 1 Millisecond 3 Axes, 10 Blows/ Axis	99	0
I II	Thermal Shock	X	"	-55°C to +125°C 10 Cycles	99	0
I III	Moisture Resistance	X	"	10 Cycles Method 106 MIL-STD-202 Steps 1-6	99	0
I III V	Life	X	"	2000 Hours @ 50V @ 85°C	74	4
I III V	Life	X	"	2000 Hours @ 50V @ 125°C	15	2

(OVER)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(1) Test started with 170 specimens divided into groups. Group I - 50 parts, Group II - 50 parts, Group III - 10 parts, Group IV - 10 parts, Group V - 10 parts. Except for removed failures, parts were subjected in equal quantities sequentially to the tests as shown.

(2) Failure definition is open, short or inability to sustain voltage on Life Test.

(OVER)

21. REPT. NO. 152.20.50.40-E4-09CR

17. TESTED BEYOND VENDOR CATALOG SPECIFICATIONS	YES	18. VENDOR INFORMED OF TEST RESULT BY: LETTER	CY OF REPT	ORAL	19. SIGNED	20. CONTRACTOR	SUBCONTRACTOR
	X		X				Pan Technical Systems, Inc

ITEM	8A PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10. VENDOR PART NO	11 IND GOV. STD NO	12 TOTAL TESTED
5	Radial Lead Flat Ceramic Capacitor 0.1 mfd ±10% 50V	Vitramon	VK30BX104K		170
6					
7					
8					

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED	
III V	Life	X	JPL 152.20-02	2000 Hours @ 100 V @ 85°C	15	3	
	Life	X	"	2000 Hours @ 100V @ 125°C	15	3	
	Life	X	"	2000 Hours @ 200 V @ 85°C	15	2	
	Life	X	"	2000 Hours @ 200 V @ 125°C	15	0	
III	Temperature Coefficient	X	"	Capacitance, Dissipation Factor and Insulation Resistance @ -55°C to +145°C	10	0	
III	Lead Bend and Pull	X	"	5 lb. Pull followed by Bend & 5 - 360° arcs	10	0	
IV	Voltage Breakdown	X	"	Increase D. C. working Voltage to Destruction	10	10	(3)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(3) Tested to Destruction values of breakdown voltage ranged from 480volts to 1240 volts.

21. REPT. NO 152.20.50.40-E4-09CR

DEPARTMENT NO. 1A 962

REPORT SUMMARY SHEET

1 COMPONENT PART NAME PER GENERIC CODE	2. PROGRAM OR WEAPON SYSTEM	3.	DAY	MO	YR
Capacitor, Fixed Ceramic, Lead Mount	Mariner	TEST COMPL.	7	30	65
4 ORIGINATOR'S REPORT TITLE	5. ORIGINATOR'S REPORT NO.	REPT. COMPL.	8	30	65
Evaluation Test, Ceramic Capacitors, Tubular and Flat	152.20-02				
	6. TEST TYPE, ETC.				
	Evaluation to JPL Requirements				

7 THIS TEST (SUPERSEDES) (SUPPLEMENTS) REPORT NO: Supplements 152.20.50.40-E4

ITEM	8A. PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10. VENDOR PART NO.	11. IND. GOV. STD. NO.	12 TOTAL TESTED
1	Radial Lead Flat Ceramic Capacitor 0.1 mfd ±10% 75V	Westcap	B758BX104K		170
2					
3					
4					

(OVER)

13. INTERNAL SPECS. ETC REQ'D TO UTILIZE REPT.	ENCL	SENT WITH REPORT NO	14. MIL. SPECS./STDS. REFERENCED IN 15C
A JPL Test Procedure			D MIL-STD-202C
B 152.20-02			E
C			F

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO TESTED	G NO FAILED
all	Visual Inspection	X	JPL 152.20-02	Examine for Defects 3X Magnification	170	0
all	Initial Measurements	X	"	Capacitance, Dissipation Factor, Insulation Resistance	170	0 (2)
I	Screen Burn-in	X	"	168 hrs. @ 2 x Rated Voltage @ 125°C	170	0
I II	Vibration	X	"	50 - 3000 Cycles, 35g rms 3 axes, 6 sweeps/axis	100	2
I III	Shock	X	"	300 g Peak, 1 Millisecond 3 Axes, 10 Blows/ Axis	98	1
I II	Thermal Shock	X	"	-55°C to +125°C 10 Cycles	97	0
I III	Moisture Resistance	X	"	10 Cycles Method 106 MIL-STD-202 Steps 1-6	97	4
I II V	Life	X	"	2000 Hours @ 50V @ 85°C	72	3
I II V	Life	X	"	2000 Hours @ 50V @ 125°C	14	0

(OVER)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(1) Test started with 170 specimens divided into groups. Group I - 50 parts, Group II - 50 parts, Group III - 10 parts, Group IV - 10 parts, Group V - 10 parts. Except for removed failures, parts were subjected in equal quantities sequentially to the tests as shown.

(2) Failure definition is open, short or inability to sustain voltage on Life Test.

(OVER)

21. REPT. NO. 152.20.50.40-E4-10CR

17. TESTED BEYOND VENDOR CATALOG SPECIFICATIONS	YES	18. VENDOR INFORMED OF TEST RESULT BY: LETTER	CY OF REPT	ORAL	19. SIGNED	20. CONTRACTOR	SUBCONTRACTOR
	X		X				Pan Technical Systems, Inc

ITEM	8A PART TYPE, SIZE, RATING, LOT, ETC	9 VENDOR	10 VENDOR PART NO	11 IND GOV STD NO	12 TOTAL TESTED
5	Radial Lead Flat Ceramic Capacitor 0.1 mfd ±10% ~~75V~~	Westcap	B758BX104K		170
6					
7					
8					

15A ITEM	TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/ METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO. TESTED	G NO. FAILED	
~~III~~ V	Life	X	JPL 152.20-02	2000 Hours @ 100 V @ 85°C	13	0	
	Life	X	"	2000 Hours @ 100V @ 125°C	14	0	
	Life	X	"	2000 Hours @ 200 V @ 85°C	15	0	
	Life	X	"	2000 Hours @ 200 V @ 125°C	15	1	
~~III~~	Temperature Coefficient	X	"	Capacitance, Dissipation Factor and Insulation Resistance @ -55°C to +145°C	10	0	
III	Lead Bend and Pull	X	"	5 lb. Pull followed by Bend & 5 - 360° arcs	10	0	
IV	Voltage Breakdown	X	"	Increase D. C. working Voltage to Destruction	10	10	(3)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

(3) Tested to Destruction values of breakdown voltage ranged from 420 volts to 910 volts.

21. REPT. NO. 152.20.50.40-E4-10CR

II. INTRODUCTION

This report presents the results of a study of the electrical performance, environmental resistance, and life longevity for Miniature Ceramic Capacitors under various temperature and voltage stress conditions. These capacitors are advanced "state-of-the-art" units wherein higher values of capacitance for a given size are fabricated than are normally offered in currently available Military Grade parts.

The basic purpose of this test is to determine the suitability of these types of capacitors for spacecraft applications. The test included ten types of parts from eight manufacturers in order that a direct comparison of performance can be accomplished.

The test plan, as shown subsequently, was designed to yield, in addition to life test information, the effects, if any, of environmental exposures upon longevity, as well as the effects of an initial screen, or "burn-in" exposure conducted in accordance with JPL Specification 2073-0101D.

Testing was conducted per the following documents:

JPL Test Procedure No. 152.20-02, dated May 13, 1964 entitled, "Test Procedure, Electronic Component Parts Reliability Evaluation Test, Ceramic Capacitors Tubular and Flat", as modified by

PTS Proposal 64-6, and

JPL Technical Direction Memorandum #1, dated March 16, 1965

Statistical Data reduction was performed in accordance with JPL Specification 20040.

III. DESCRIPTION OF TEST ITEMS

Table 1 is a complete listing of the parts tested. All parts were furnished to Pan Technical Systems by JPL.

Manufacturer	Part Number	Capacitance MFD	tol	D.F. Max.	WVDC @ Max °C	Range (°C)	COEFF	I.R. Min. (Megohm)	Case Size (Max.) & Configuration
Aerovox	MC605104RK	0.10	10%	2%	50	-55 +125	-15% +10%	100K	Radial leads .300 x .300 x .100
Chem-Electro	CK2R104K	0.10	10%	2%	200	-55 +125	±15%	100K	Radial leads .300 x .300 x .100
Gulton	CK16M104K	0.10	10%	2.5%	50	-55 +125	±15%	10K	Radial leads .300 x .300 x .100
Gulton	CN05M105K	1.0	10%	2.5%	100	-55 +125	±15%	0.2K	Axial lead .520 x .370 x .300
King Elect.	KC80BW104K	0.10	20%	2.5%	50	-55 +125	-15% +25%	10K	Radial leads .515 x 515 x .165
Scionics	SCM30D104K	0.10	10%	2.5%	(4) 50	(4) -55 +85	(4) ±10%	25K	Axial leads .130 x .380 x .92
EMC	EK200R104K	0.10	10%	2.5%	200V	-55 +125	±15%	100K	Radial leads .300 x .300 x .100
Vitramon	VL02BK103K V-LAM	0.01	±10%	2.5%	100	-55 +125	-10% +15%	100K	.280 x .100 Tubular, Axial lead
Vitramon	VK30BX104K	0.10	±10%	3.0%	50	-55 +125	-10% +15%	1K	Radial leads .300 x .300 x .100
Westcap	B758BX104K	0.10	±10%	2.5%	75V	-55 +125	±15%	10K	Radial leads .500 x .500 x .150

1 - All capacitors meet environmental requirements of MIL-C-11015C
2 - Parameters are specified at the test condition specified in this test procedure
3 - All capacitors are packaged in molded plastic cases
4 - Derate to 25 VDC from 85°C to 150°C, with TC of ±15%

TABLE 1

IV. TEST DESIGN

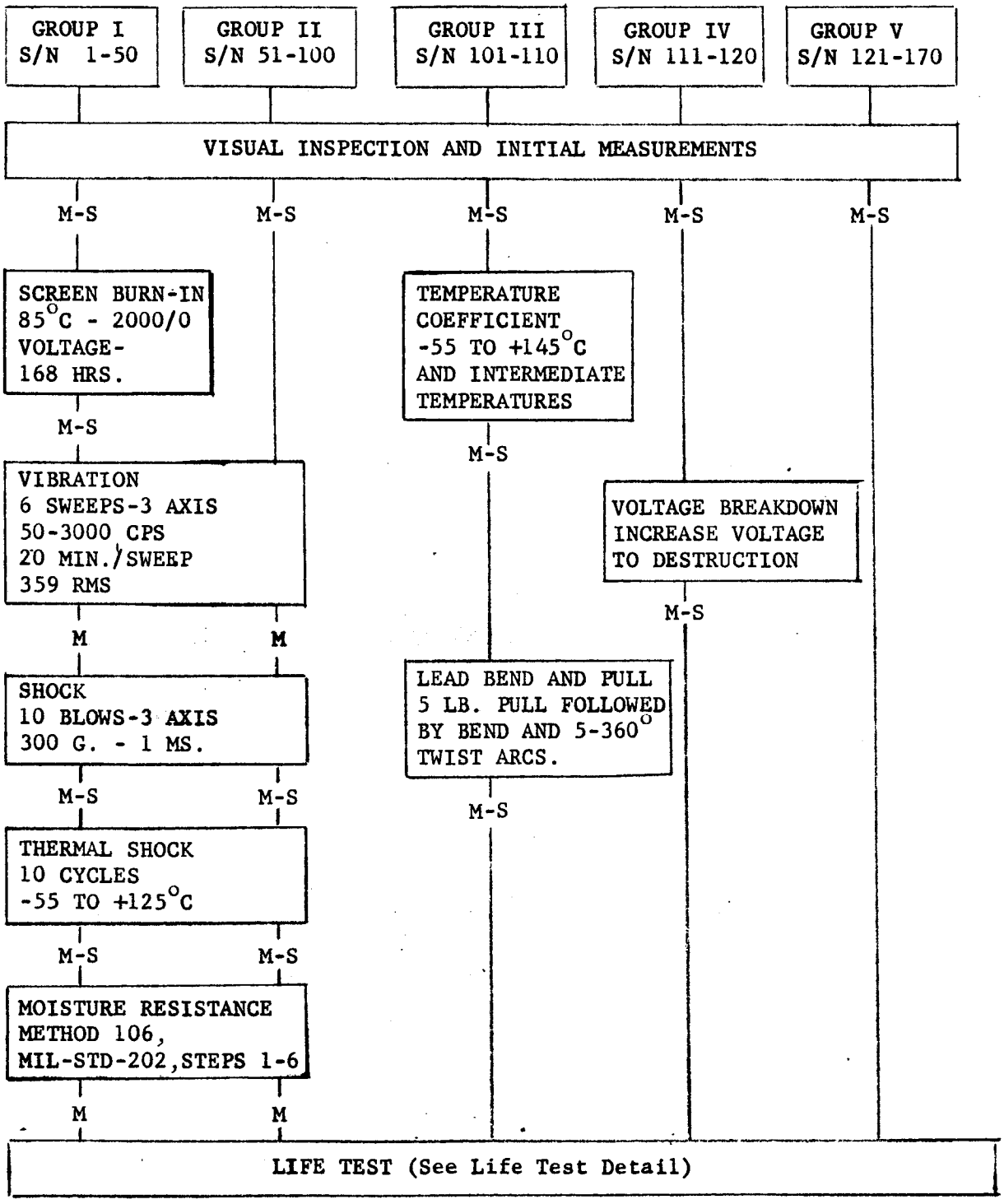
The test design is best described by referring to Figure 1. This test plan was used for each type of part. All tests of different type parts were performed, insofar as possible, in parallel, so that valid comparative results could be obtained.

As shown by Figure 1, the basic sample size for the test was 170 individual parts. These parts were divided into five groups. All parts were subjected to Visual Inspection and Initial Measurements. Group I (50 parts) was subjected to a Screen Test, followed by sequential Environmental Exposures and Life Testing. Group II (50 parts) paralleled Group I except that the Screen Test was omitted. Group II (10 parts) was subjected to Temperature Coefficient and Terminal Strength Tests. Group IV (10 parts) was subjected to a High Voltage Breakdown Test, followed by Failure Analysis (dissection and visual inspection). Group V (50 parts) was subjected only to the Life Test.

In addition to the above, five extra units of each type were supplied as a Control Group. The Control Group was measured prior to conducting measurements at each data point throughout the test series. Data for these measurements is submitted as part of the Test Log.

Following the completion of the Environmental Tests, parts from Groups I, II and V were combined and submitted to a 2 (Temperature) x 3 (Voltage) Matrix Life Test as illustrated by Figure 2. While data submitted is by the combined Groups, i.e. I, II and V, individual part identity was maintained to permit inter-group comparisons if deemed necessary at some future time.

FLOW CHART



M - MEASUREMENT POINT
S - DATA SUBMITTAL POINT

Figure 1

LIFE TEST DETAIL

LIFE TEST MATRIX

TEST VOLTAGE	TEST TEMPERATURE	
	85°C	125°C
50 V.	GROUP I PART NUMBER 1- 25 - GROUP I* 51- 75 - GROUP II 121-145 - GROUP V (75 TOTAL)	GROUP II PART NUMBER 36- 40 86- 90 156-160 (25 TOTAL)
100 V.	GROUP III PART NUMBER 26- 30 76- 80 146-150 (25 TOTAL)	GROUP IV PART NUMBER 41- 45 91- 95 161-165 (25 TOTAL)
200 V.	PART NUMBER 31- 35 81- 85 151-155 (25 TOTAL)	PART NUMBER 46- 50 96-100 166-170 (25 TOTAL

* REFER TO PRE LIFE GROUPS.

MEASUREMENT AND DATA SUBMITTAL AT 168, 500, 1000 AND 2000 HOURS.

Figure 2

V. MEASUREMENT PROCEDURE

All electrical measurements were made at room ambient conditions of $25^{\circ}C \pm 3^{\circ}C$, and a relative humidity of less than 55% except where otherwise noted.

CAPACITANCE AND DISSIPATION FACTOR

For these measurements a General Radio 1608A Impedance Bridge, Serial #221, operated in the C_s (series capacitance) configuration was employed. The 1000 cycle source and selective detector supplied as a part of the bridge were used for excitation and null determination, respectively. The signal level to the bridge arms was maintained at 0.75 ± 0.25 volts.

The manufacturer's rated accuracy for this bridge at 1000 cycles is as follows:

Capacitance - on ranges used, $\pm 0.1\% \pm .005\%$

Dissipation Factor - $\pm 5\% \pm .0005$

Calibration of this bridge is yearly. The calibrating agency was General Radio. The latest calibration was August 20, 1964.

INSULATION RESISTANCE

Insulation Resistance was calculated from Leakage Current Measurements. Readout was accomplished by means of a Hewlett Packard Type 425A Microvolt Ammeter Serial 425-06530. The manufacturer's rated accuracy for this instrument is $\pm 3\%$ of end scale reading. Calibration of this instrument is yearly. Latest calibration was March 9, 1965. The calibrating agency was Hewlett Packard. The electrification source for these tests was a Hewlett Packard 711A Power Supply. Two minutes of polarization was allowed for all readings taken throughout the test series.

VISUAL AND MECHANICAL INSPECTION

All capacitors were examined under 3X magnification for body cracks, nicked leads and other physical defects and indications of poor workmanship. Capacitors were inspected for part designation, nomenclature, legibility and permanence of marking. All comments are presented under "Test Results" as well as a detailed sketch of one capacitor of each type showing all dimensions and manufacturer's information included on the capacitor body.

VI. ENVIRONMENTAL TEST PROCEDURES

CAPACITOR TEMPERATURE COEFFICIENT (T_C)

Group II capacitors were placed in a temperature chamber capable of providing a temperature accuracy of $\pm 3^{\circ}C$. Electrical measurements were made at $+25^{\circ}C$, $-15^{\circ}C$, $-55^{\circ}C$, $+25^{\circ}C$, $+65^{\circ}C$, $+85^{\circ}C$, $+125^{\circ}C$, $+145^{\circ}C$ and $+25^{\circ}C$ respectively. The capacitors were allowed to stabilize for one hour at each temperature prior to making measurements of Capacitance and Dissipation Factor.

Prior to making the first measurements fixture leakage on the unloaded fixture was checked and found to be below the level of resolution of the instrumentation employed. Therefore, no corrections were applied to the results for fixture leakage.

VOLTAGE BREAKDOWN TEST

This test consisted of slowly increasing the d. c. voltage applied to the part until destructive breakdown occurred and recording the result. The apparatus used was a Hewlett Packard 412A Vacuum Tube Voltmeter Serial #05485 equipped with a 2 to 1 voltage divider and a filtered DC power supply capable of output voltages in excess of 10,000 volts. The breakdown current was limited with a fast blow 1/2 ampere fuse in series with each capacitor to prevent total destruction of the test specimen when failure occurred. In the case of the small Vitramon capacitors, the first unit did suffer severe mechanical destruction. Therefore, the 1/2 ampere fuse specified was reduced to a 1/8 ampere fast blow fuse. However, the units, for the most part, were still destroyed.

LEAD BEND AND PULL

A five pound weight was applied to the leads of each capacitor in a direction away from the body. The weight was gradually applied over a minimum period of four seconds and maintained for a minimum of 10 seconds. Axial lead capacitors were tested by clamping one lead in a vise and applying weight to the other lead. Radial lead

types were tested by clamping the body in a vise and applying the weight to each lead in a direction perpendicular to and away from the body.

For the Lead Bend Test the leads of each capacitor were bent 90^{o} at a point 1/4 inch from the body with a radius of curvature of 1/32 inch. The lead wire was then clamped 3/64 inch from the bend between the bend and the lead end. The capacitor body was then rotated about the original axis of the bent lead through 360^{o} CW and CCW a total of five times at a rate of approximately five seconds per rotation. The capacitors were then visually inspected under 3X magnification for evidence of breaking and loosening of the lead termination or chipping of the body coating.

SCREEN TEST

Capacitors assigned to Group I were subjected to a Screen Test in accordance with JPL Specification 2073-0101D which included the visual and mechanical inspection above, a solder test, initial measurements and an operational run-in at an ambient temperature of 85^{o}C for 168 hours at 200% rated voltage. JPL General Specification 2073-GEN C was not applicable for this program.

Parts were mounted on the jigs later to be used for Life Testing. (See Life Test Diagram). Units were connected in parallel through 10,000 ohm resistors. The PTS Combined Environmental Chamber was used for the Temperature Environment.

VIBRATION VARIABLE FREQUENCY

All capacitors in Group I and II were subjected to simple harmonic motion having an acceleration of 35 $\pm$5 G's (RMS) which ranged in frequency from 50 to 3000 cycles. The frequency sweep was 50 to 3000 to 50 at a logarithmic rate of approximately 20 minutes per sweep. This frequency sweep was performed six times in each of the X, Y and Z axes of the parts under test for a total vibration period of six hours.

The capacitors were mounted in channeled "sandwich" arrangement to permit simultaneous clamping of the leads and body. Double sided masking tape was used on the mounting channels for padding and constraint.

The equipment used to perform this test was a Calidyne Shaker System, consisting of a Model 58A Shaker Head and a Model 54 Control Console.

MECHANICAL SHOCK

All capacitors in Groups I and II were subjected to ten (10) shock blows in each of the X, Y and Z axes for a total of 30 blows. Each shock blow was of a half sine wave of 300G +0, -10% and a duration of 1.0 $\pm$0.5 milliseconds.

The capacitors were mounted in the same fixtures identical to the Vibration Test.

The following equipment was used for this test:

Drop Tester Jolta Model M500 Serial #122

Accelerometer, Endevco Model 2215C, Serial GA76

Oscilloscope, Hewlett Packard Model 150A, Serial #1860

THERMAL SHOCK

All capacitors in Groups I and II were subjected to ten Thermal Shock cycles. Each cycle consisted of 15 minutes at -55^{o}C +3^{o}C,-0^{o}C, and 15 minutes at +125^{o}C, +0^{o}C, -4^{o}C. The transition time between temperatures was held to less than 5 minutes. At the completion of the tenth cycle the capacitors were removed from the chamber and allowed to stabilize overnight before performing further measurements. The chamber used was the PTS Combined Environmental Chamber.

MOISTURE RESISTANCE

All capacitors were subjected to the 10 day Moisture Resistance Test specified in MIL-STD-202C Method 106A-1 except that steps 7a and 7b were not required nor performed. No polarization voltage was required.

A Blue M VP-206A Chamber Serial AB-128 was used for this test. Overnight stabilization was allowed prior to subsequent electrical measurements.

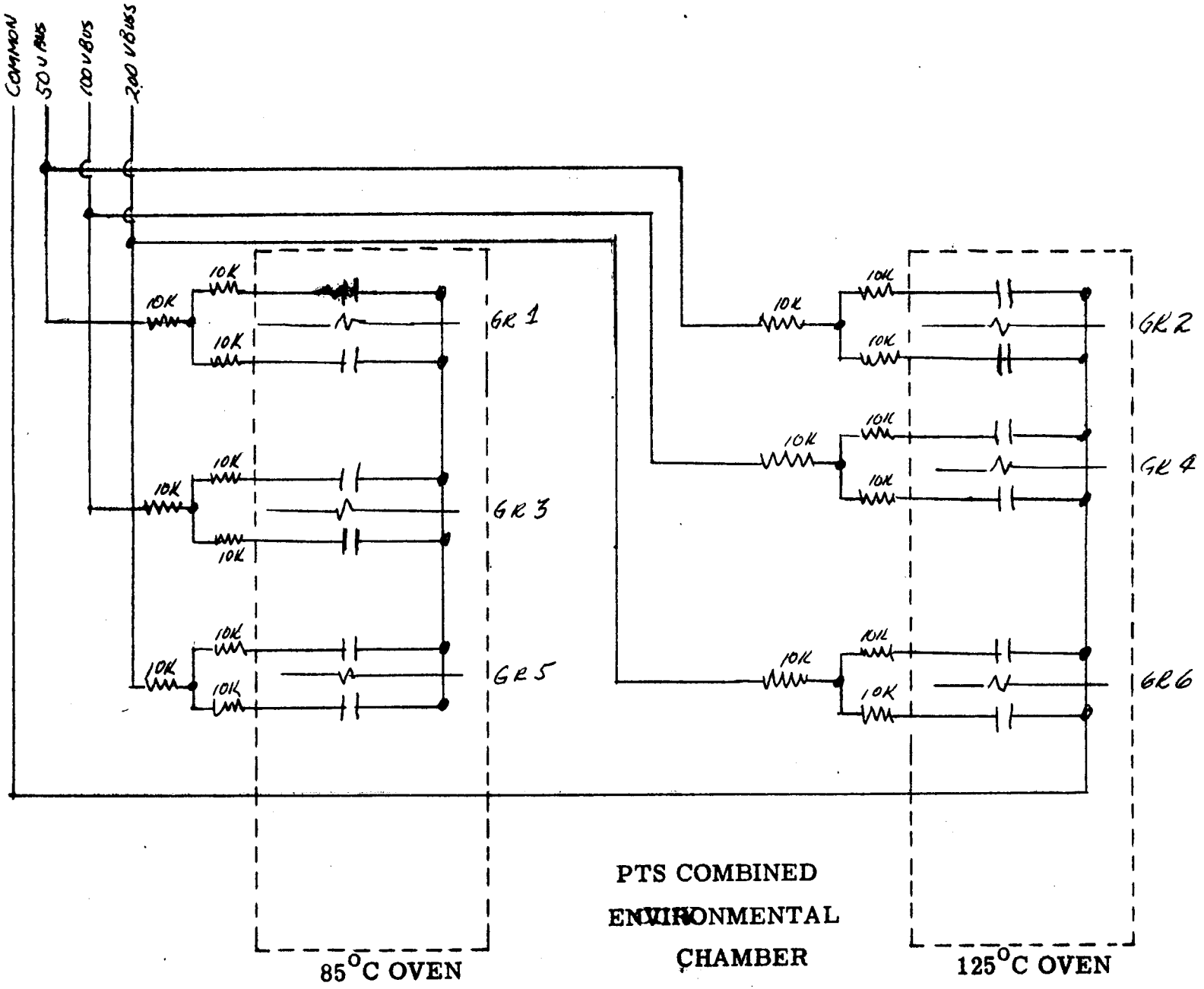
VII. LIFE TEST PROCEDURE

The Life Test Matrix for Groups I, II and V parts is given in Figure 2. The Electrical and Environmental arrangement is given in Figure 3.

Primary monitoring points were monitored daily, except weekends, throughout the test. Secondary monitoring was performed as required to remove failures as determined from primary monitoring.

Parts were mounted in seven test fixtures (approximately 200 per fixture). Wiring was arranged to supply proper voltages to the units under test. A common power source was used for all units to be operated at the same voltage.

Readings were taken at the intervals noted in the flow chart.



A. Primary monitor points - Daily - 6 per capacitor type

B. Secondary monitor points - As required - 150 per capacitor type

LIFE TEST SETUP (Per Capacitor Type) Figure 3

VIII. DATA RECORDING AND VERIFICATION PROCEDURES

Each of the parts in the test was initially tagged with a five digit serial number. Each group of 175 of each type were numbered sequentially within the number series used. While sequential numbers were not used for all of the parts in the test, no duplicate numbers were employed.

Flow charts and diagrams giving the routing of all parts through the test, complete with serial numbers were constructed. In addition, a master data log book was prepared prior to testing. Initial entries in the log included the identification of the test together with the serial numbers of the parts to be subjected to the test.

Except for failures, parts within a group or subgroup were kept and maintained in numerical order throughout the test series. At the time a failure occurred, all designated blank data entry points following the failure were filled in to eliminate translation of data.

Raw data was then punched into cards.

The following equipment was employed in the data reduction process:

IBM 402	Printer
IBM 602	Calculator
IBM 413	Reproducer, equipped with mark-sensing and end printing devices
IBM 85	Collator
IBM 24	Key Punch
Friden	Square root calculator

Standard PTS developed programming routines were followed in the computation of all statistical data presented on the Computed Statistics Sheets. In addition, special sub-routines were added to identify parametric failures in accordance with the definitions previously presented.

Post parametric failure measurements were retained and separate listings of these are presented in **Appendix II.**

All regular check points were followed for verification of the data in order to insure accuracy.

IX. TEST RESULTS

CATASTROPHIC FAILURES

Catastrophic Failure as defined for the parts listed below are those units exhibiting an open or shorted condition, body cracks or broken leads. It should be noted that catastrophic failures in the computed statistics sheets include parametric or degradation failures, where this list only includes opens, shorts, units which failed to support voltage or mechanically damaged parts.

Appendix 1 is a complete listing of catastrophic failures.

DEGRADATION OR PARAMETRIC FAILURES

Any capacitor exhibiting the characteristics listed below was classified as a degradation failure. Such units were not taken off test at the time of occurrence, however. Data for these units is not included in the statistical analysis but is presented separately.

(a) Capacitance - Initial Measurements in excess of $\pm 30\%$ of manufacturer's nominal specification, or a change of 15% between two consecutive data points.

(b) Dissipation Factor - Initial Measurements in excess of +10% of manufacturer's maximum limit or a change of greater than 100% between consecutive data points or a post environmental reading of +125% of the manufacturer's maximum specification.

(c) Insulation Resistance - Initial Measurements of less than 1000 megohms, a change greater than 1000 x between two consecutive readings or a post environmental reading of less than 10 megohms.

The complete list of parametric failures and subsequentparametric data is given in Appendix II.

GROUP III - TEMPERATURE COEFFICIENT & TERMINAL STRENGTH

I. These data and test results are presented in accordance with paragraphs 5. 2. 1 and 5. 2. 2 of JPL Test Procedure 152. 20-02.

A. TEMPERATURE COEFFICIENT

1. Apparatus Used

a. Capacitance, Dissipation Factor
General Radio Type 1608A Impedance Bridge, Serial #221

b. Insulation Resistance
Power Supply - Hewlett Packard, Type 711A, Serial #02162. Millimicro-ammeter, Hewlett Packard Type 425A, Serial #06630

c. Temperature
PTS Combined Environmental Chamber

2. Test Procedure

All Group III capacitors were loaded on a low leakage test jig, which prior to testing had been checked to determine jig leakage over the temperature range. Any leakage was determined to be below the signal to noise ratio of the test setup. Parts were allowed to stabilize one hour. at each temperature. Readings were taken of the Capacitance and Dissipation for all parts followed by Leakage Current measurements.

3. Data Presentation

Capacitance and Dissipation Factor results are presented graphically in Figure III-1-a through III-10-b. These curves are plotted using similar scales to permit ready comparison between manufacturers. The curves also demonstrate

the differences in performance of the various ceramic materials, regardless of capacitor manufacturer.

Insulation Resistance is plotted in Figures III-1-c through III-10-c. These curves indicate the difficulties of determining Insulation Resistance at 25°C or below. They do indicate however, that at higher temperatures the data is better, at least, insofar as behavior is concerned. For most parts the Leakage Current appears to be very close to an exponential function of temperature above approximately 25°C.

B. TERMINAL STRENGTH (Lead Bend and Pull)

1. Apparatus Used

a. Five pound dead weight

b. Sweep second hand watch

c. Pliers with 1/32" jaw radius

d. 3X Inspection Glass

2. Test Procedure

The five pound weight was applied to the leads of each capacitor in a direction away from the body. The weight was gradually applied over a minimum period of four seconds and maintained for a minimum of 10 seconds. Axial lead capacitors were tested by clamping one lead in a vise and applying weight to the other lead. Radial lead types were tested by clamping the body in a vise and applying the weight to each lead in a direction perpendicular and away from the body.

For the lead bend test the leads of each capacitor were bent 90° at a point 1/4 inch from the body

with a radius of curvature of 1/32 inch. The lead wire was then clamped 3/64 inch from the bend between the bend and the lead end. The capacitor body was then rotated about the original axis of the bent lead through 360^{O} CW and CCW a total of five times at a rate of approximately five seconds per rotation. The capacitors were then visually inspected under 3x magnification for evidence of breaking and loosening of the lead termination or chipping of the body coating.

3. Test Results

No leads were fractured and no defects noted.

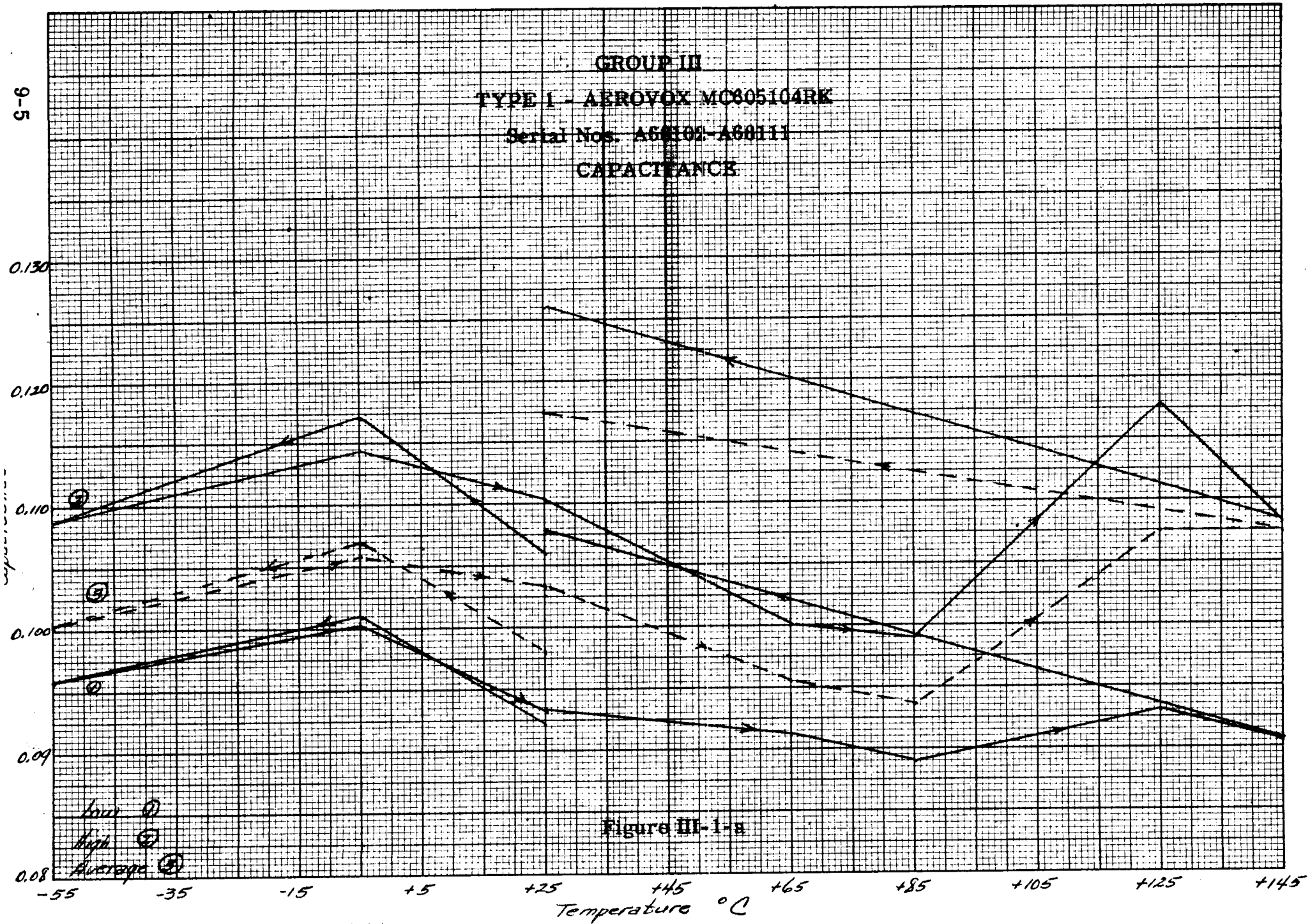


Figure III-1-a

GROUP III

TYPE 2 - CHEM-ELECTRO RESEARCH CK2R104K

Serial Nos. A68277-A68286

CAPACITANCE

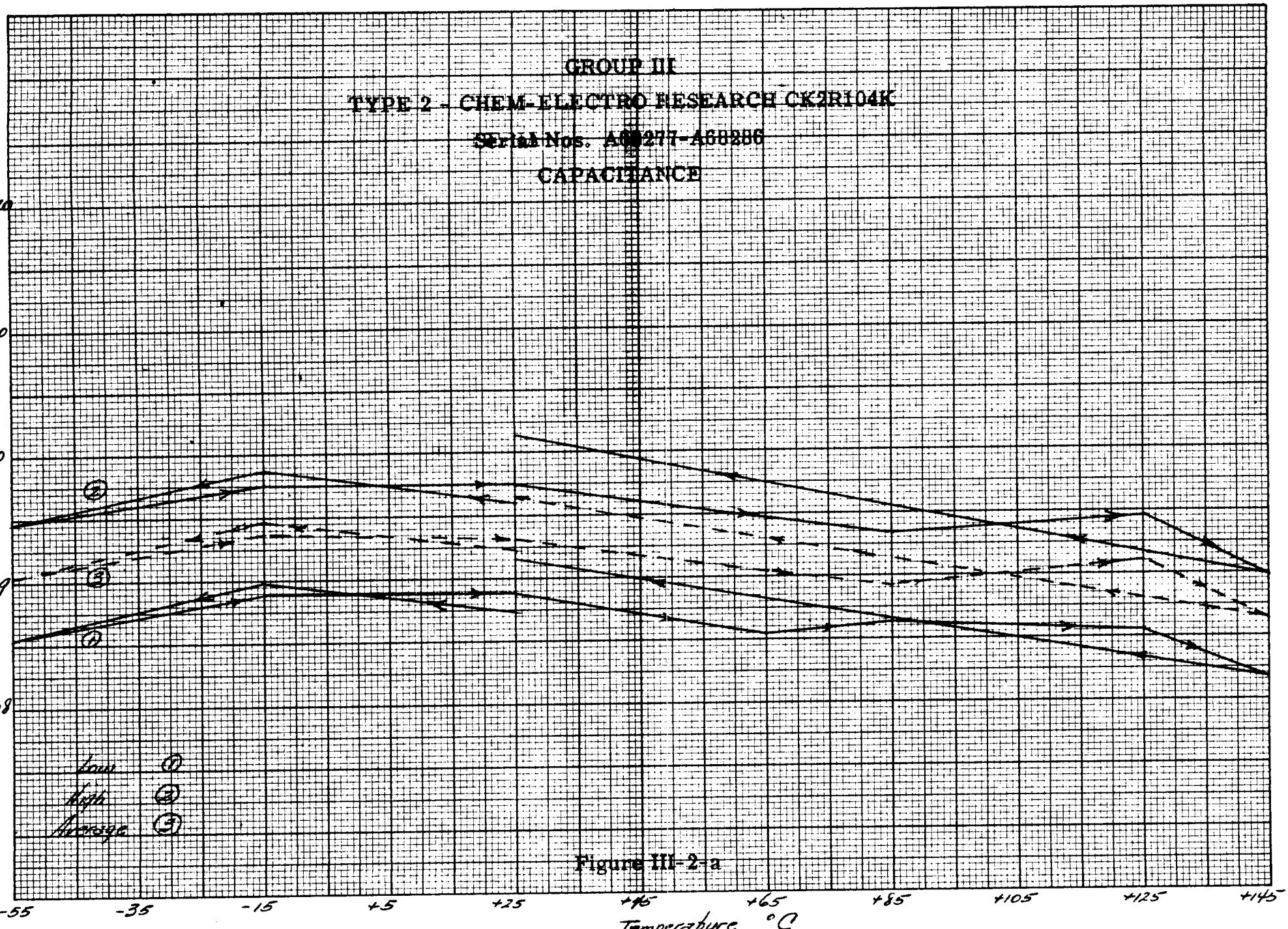


Figure III-2-a

KEUFFEL & ESSER CO. MADE IN U. S. A.

GROUP III

TYPE 3 - GULTON CK16M104K

Serial Nos. A60452-A60461

CAPACITANCE

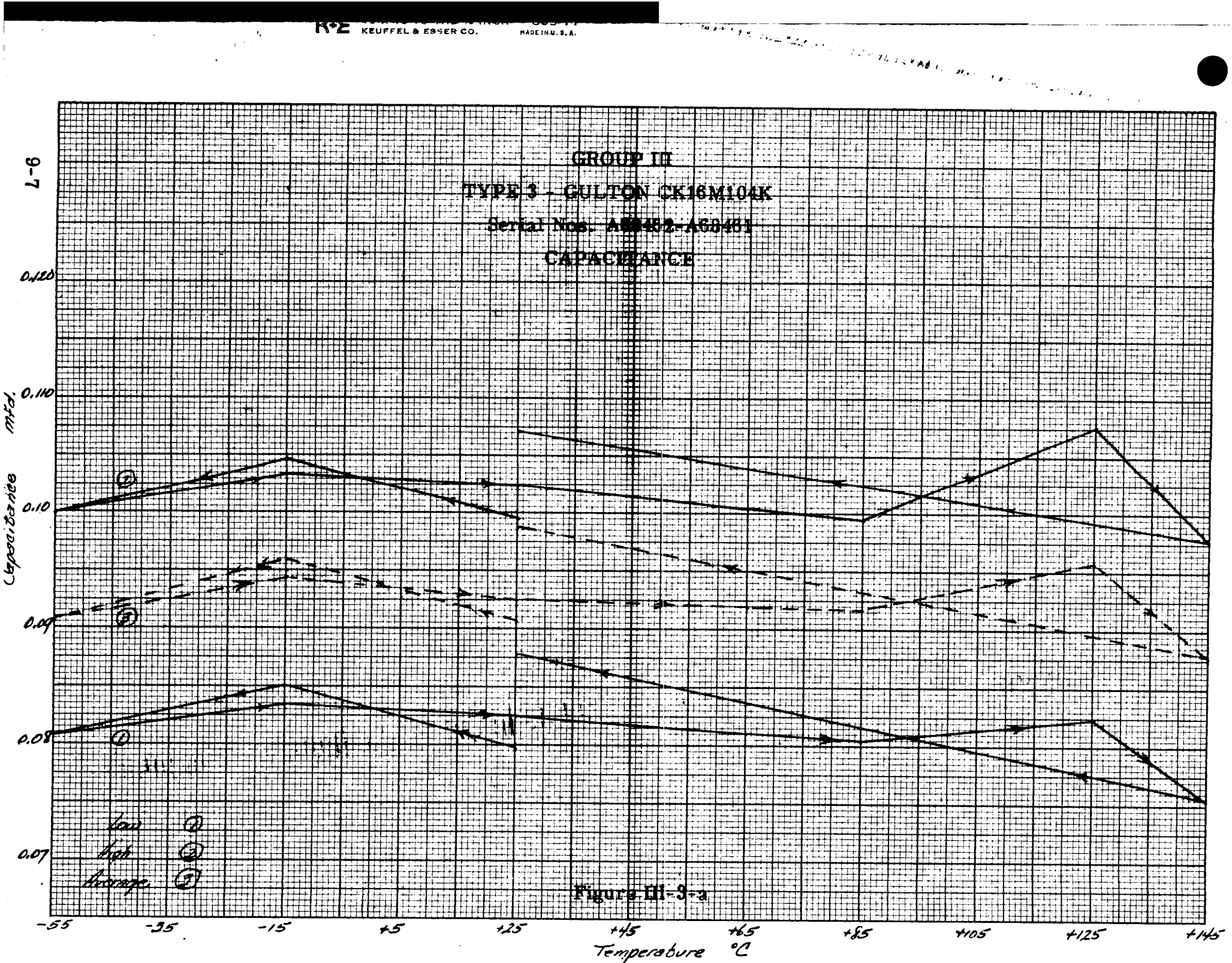


Figure III-3-a

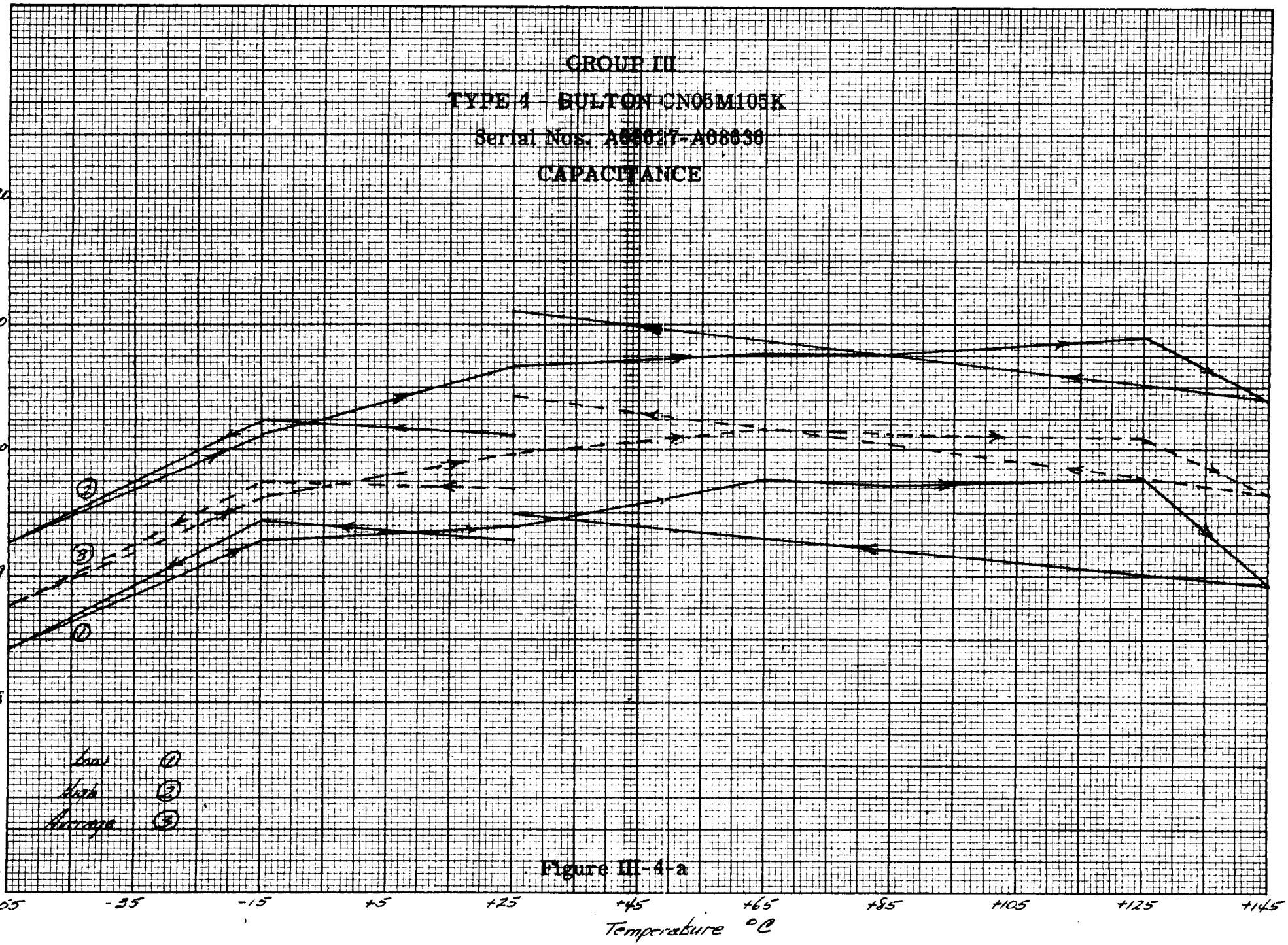


Figure III-4-a

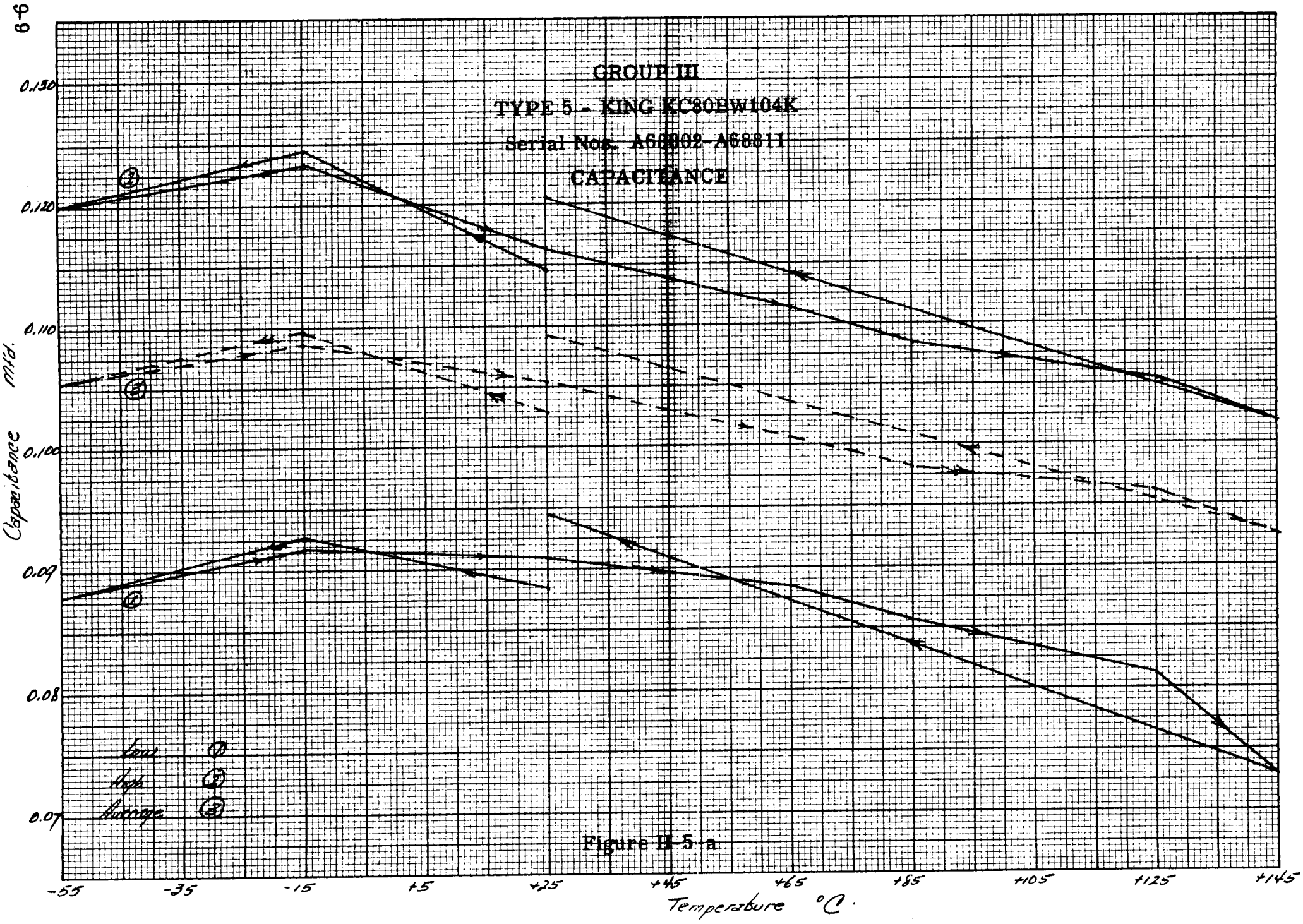


Figure B-5-a

KEUFFEL & ESSER CO. MADE IN U.S.A.

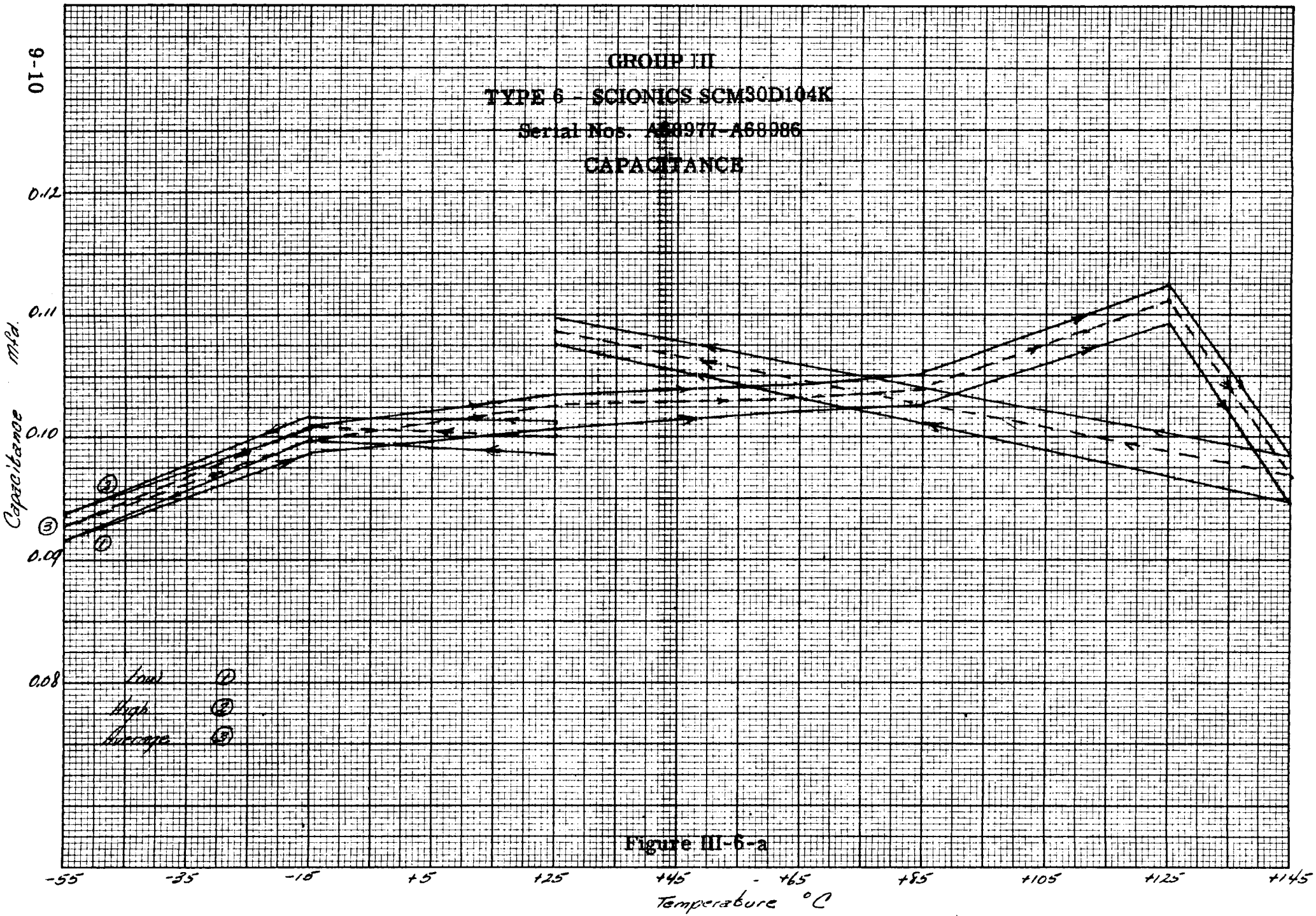


Figure III-6-a

KEUFFEL & ESSER CO. MADE IN U. S. A.

GROUP III

TYPE 7 - ELECTRO MATERIALS CORP. EI200R104K

Serial Nos. A68152-A69161

CAPACITANCE

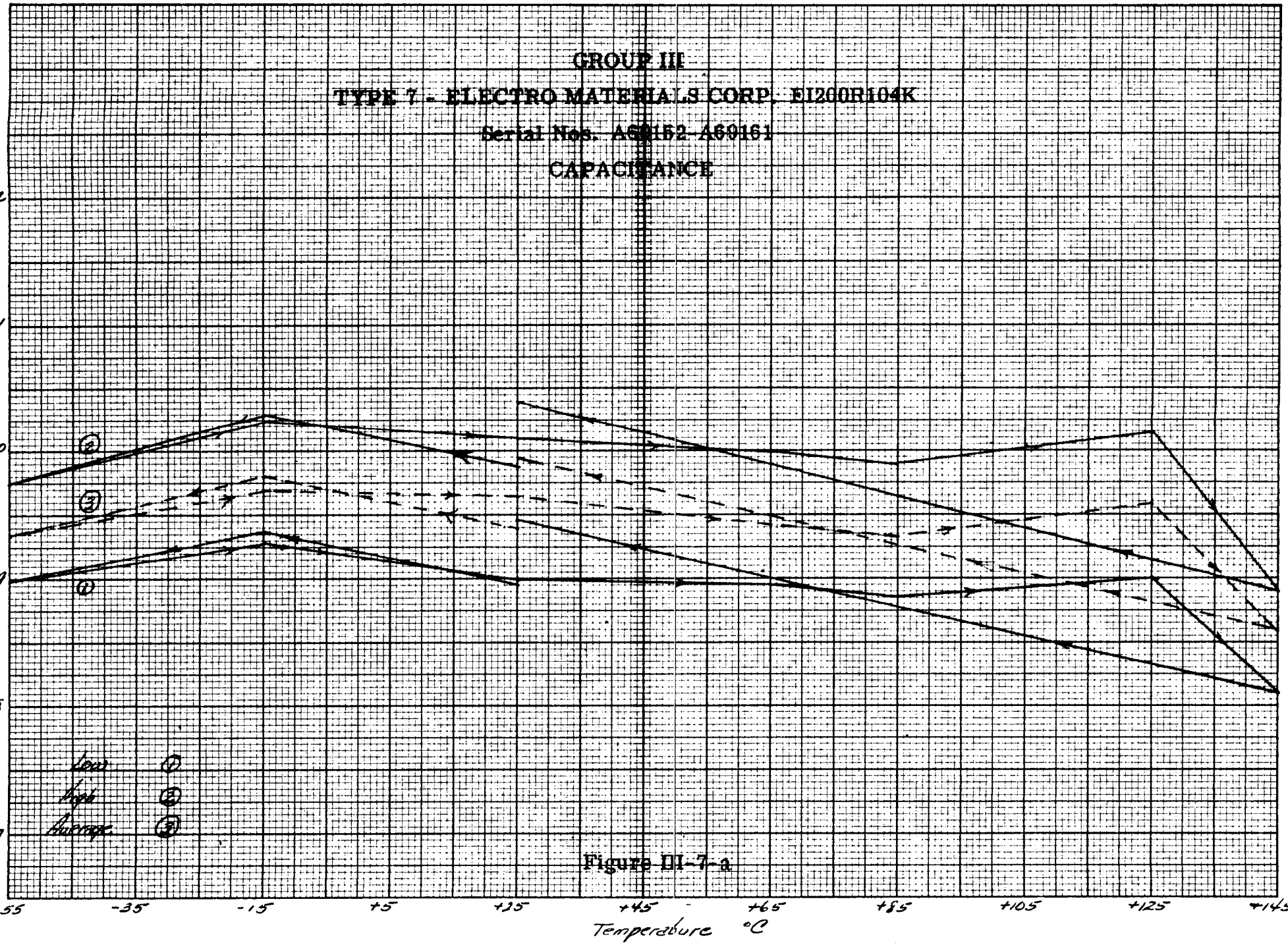


Figure III-7-a

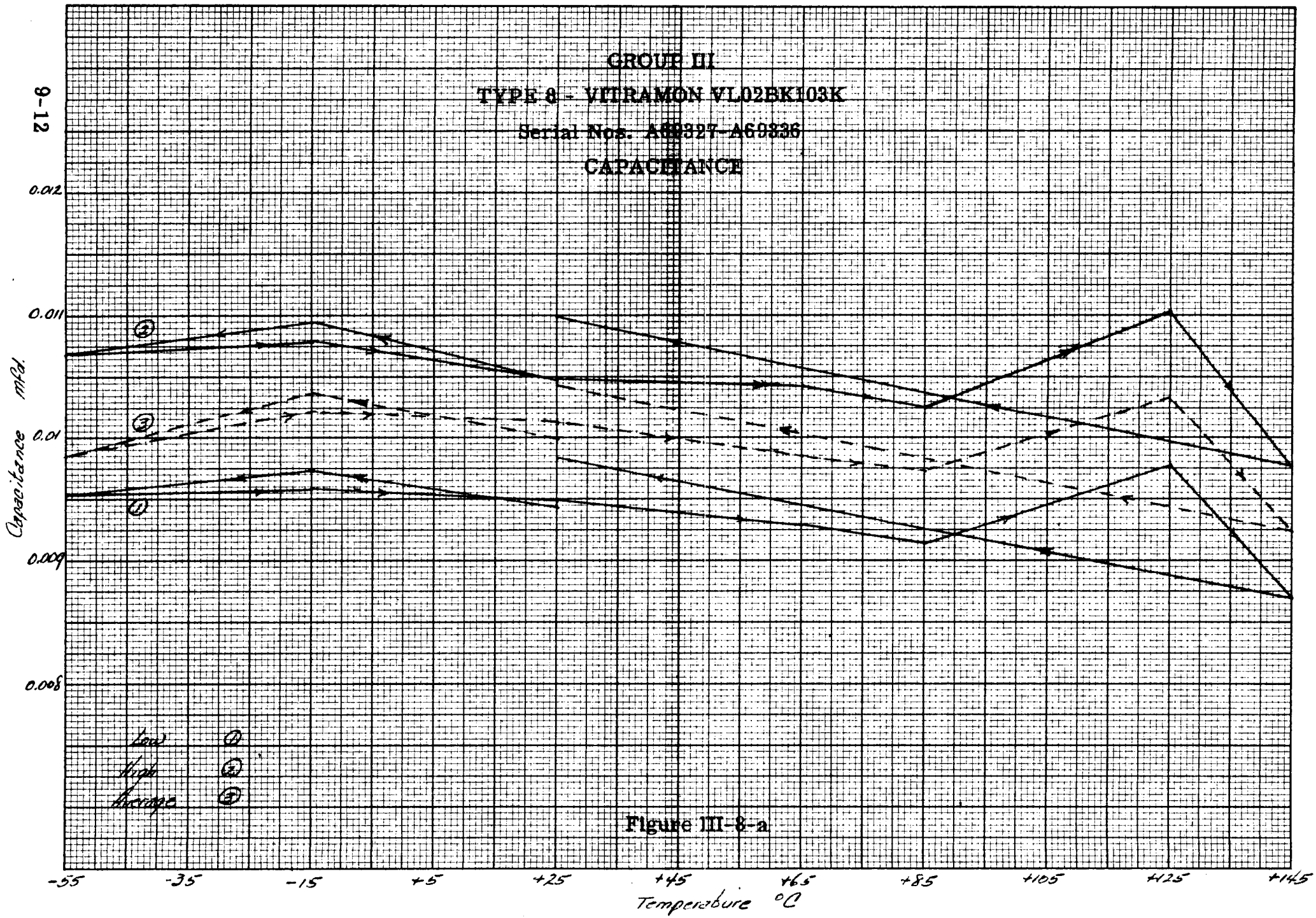


Figure III-8-a

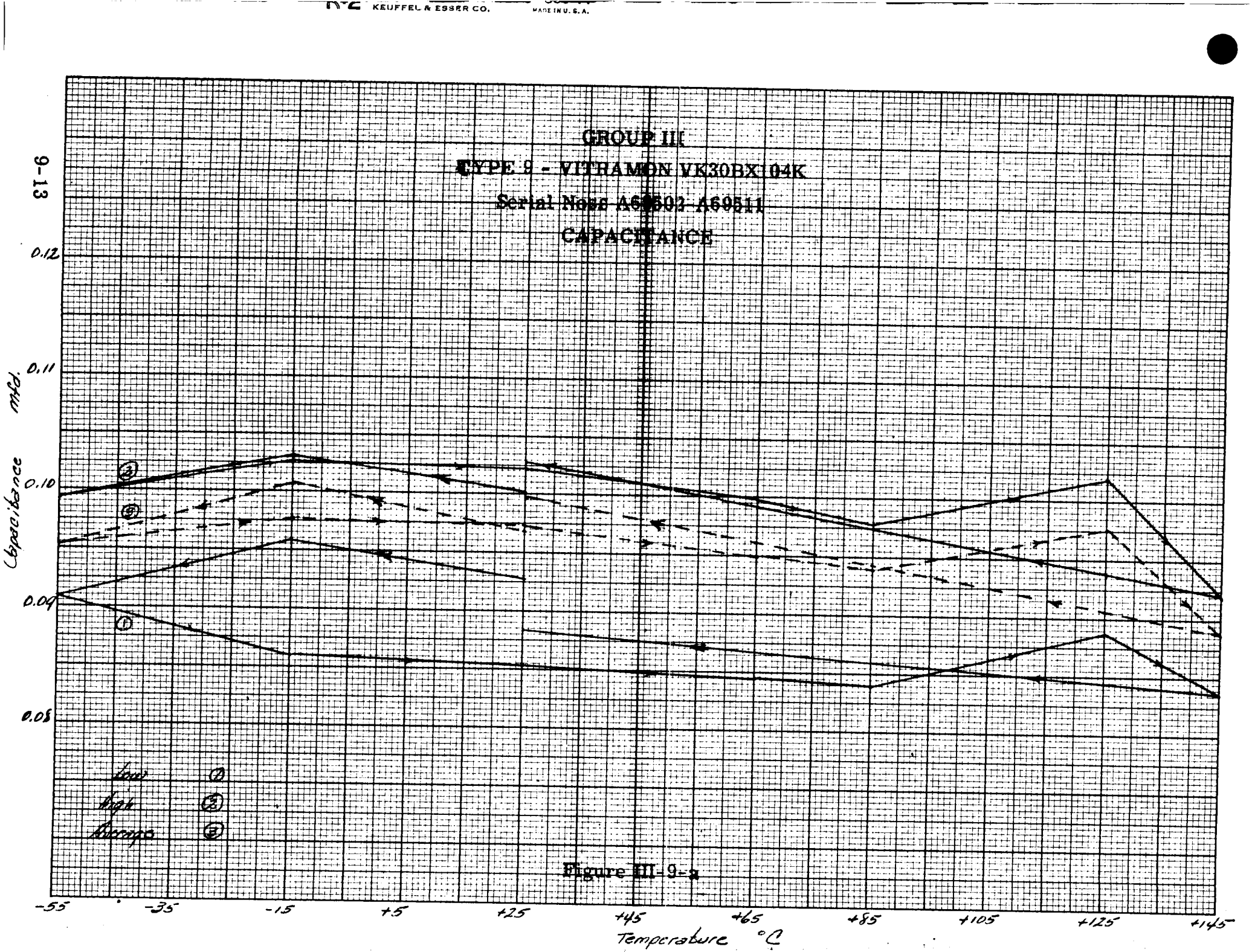


Figure III-9-a

KEUFFEL & ESSER CO. MADE IN U. S. A.

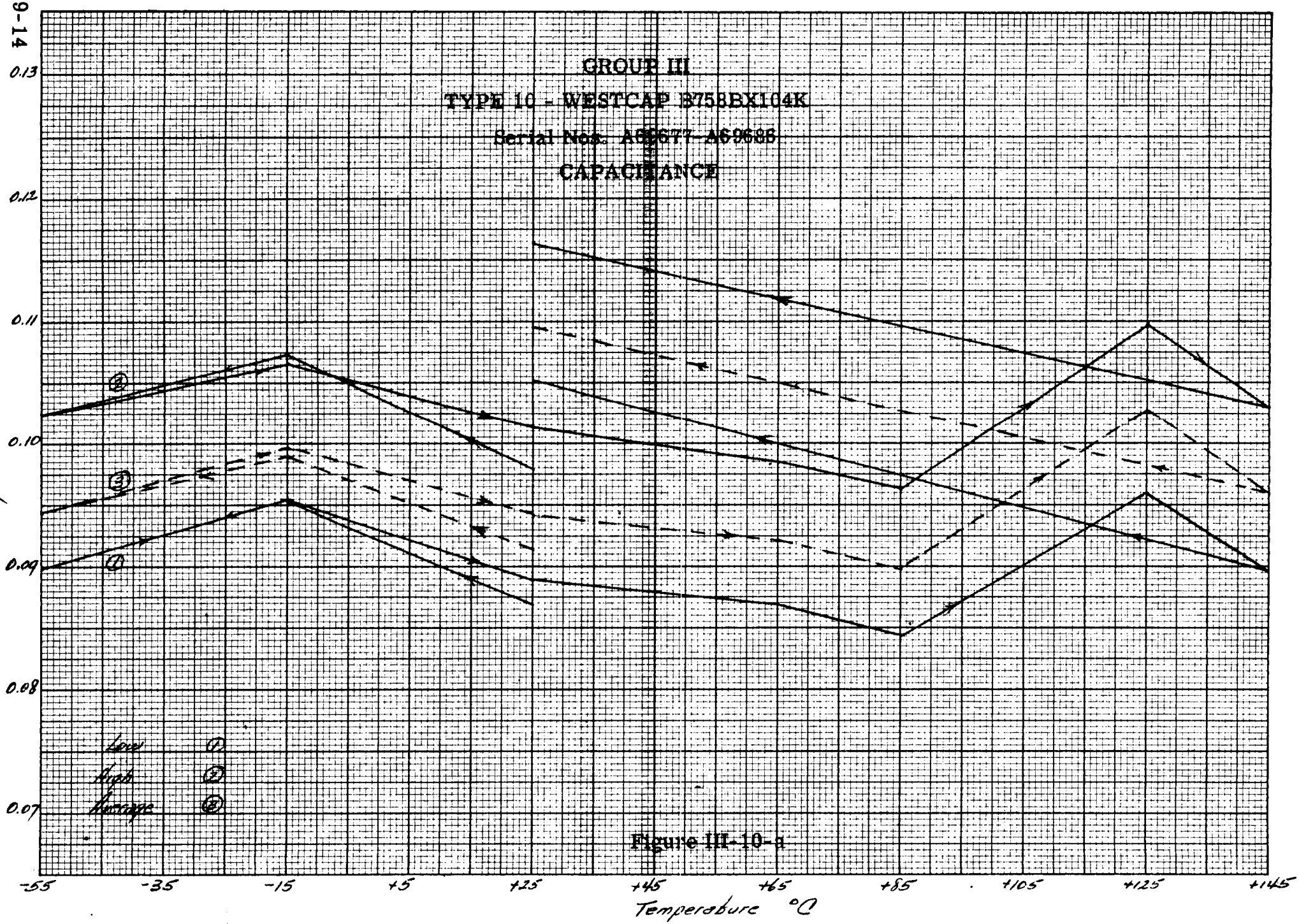


Figure III-10-a

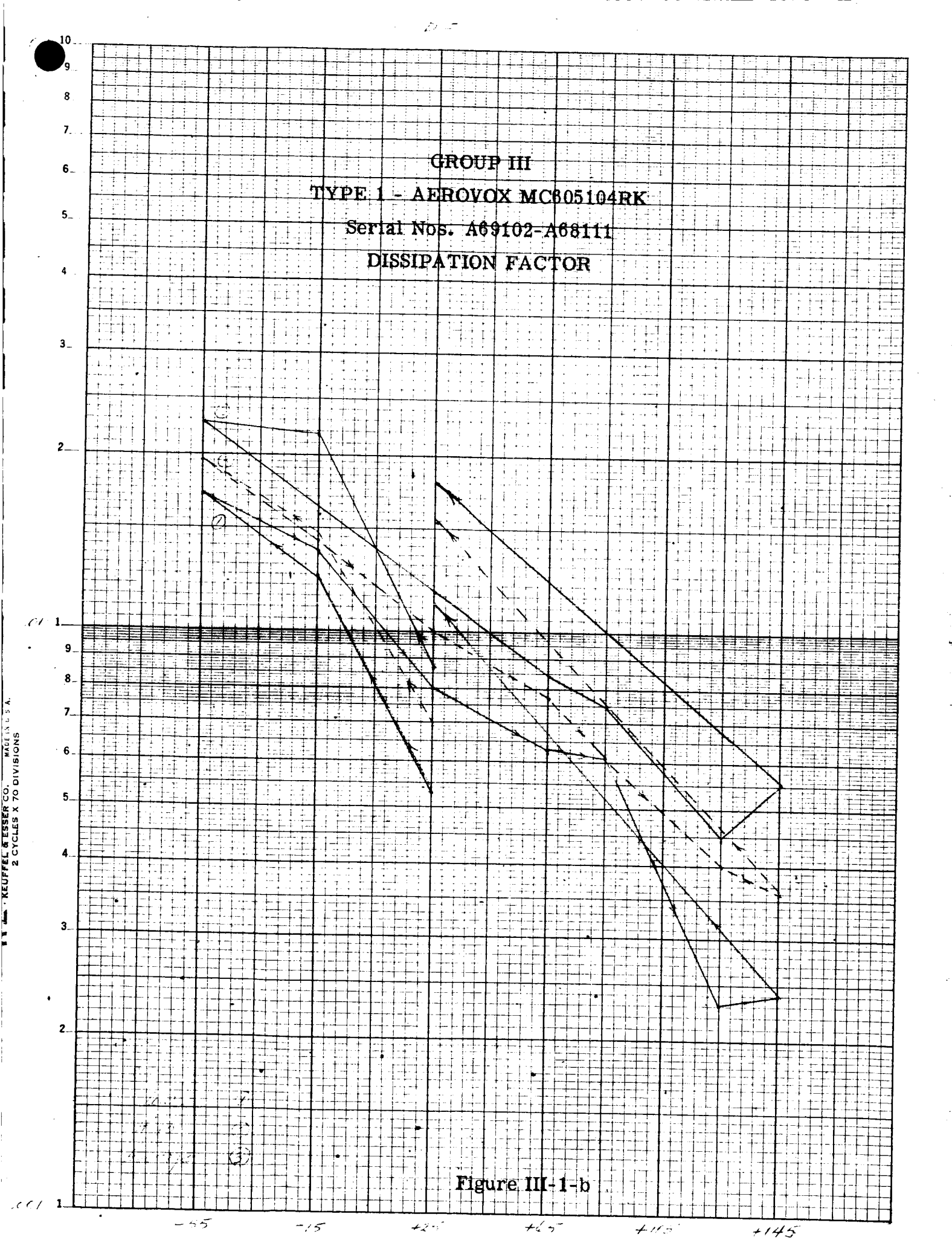


Figure III-1-b

D. F.

GROUP III

TYPE 2 - CHEM-ELECTRO RESEARCH CK2R104K

Serial Nos. A68277-A68286

DISSIPATION FACTOR

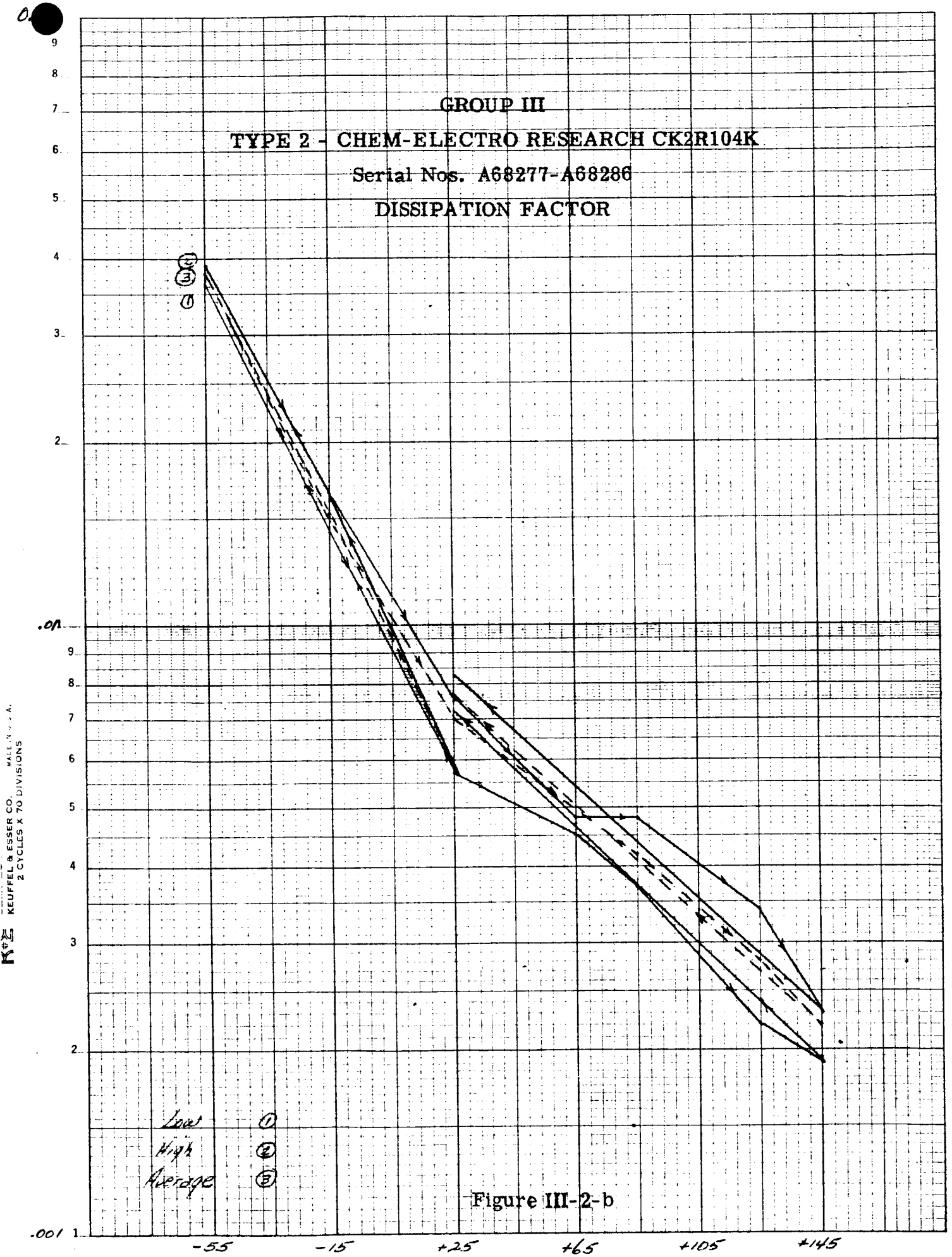


Figure III-2-b

D.F.

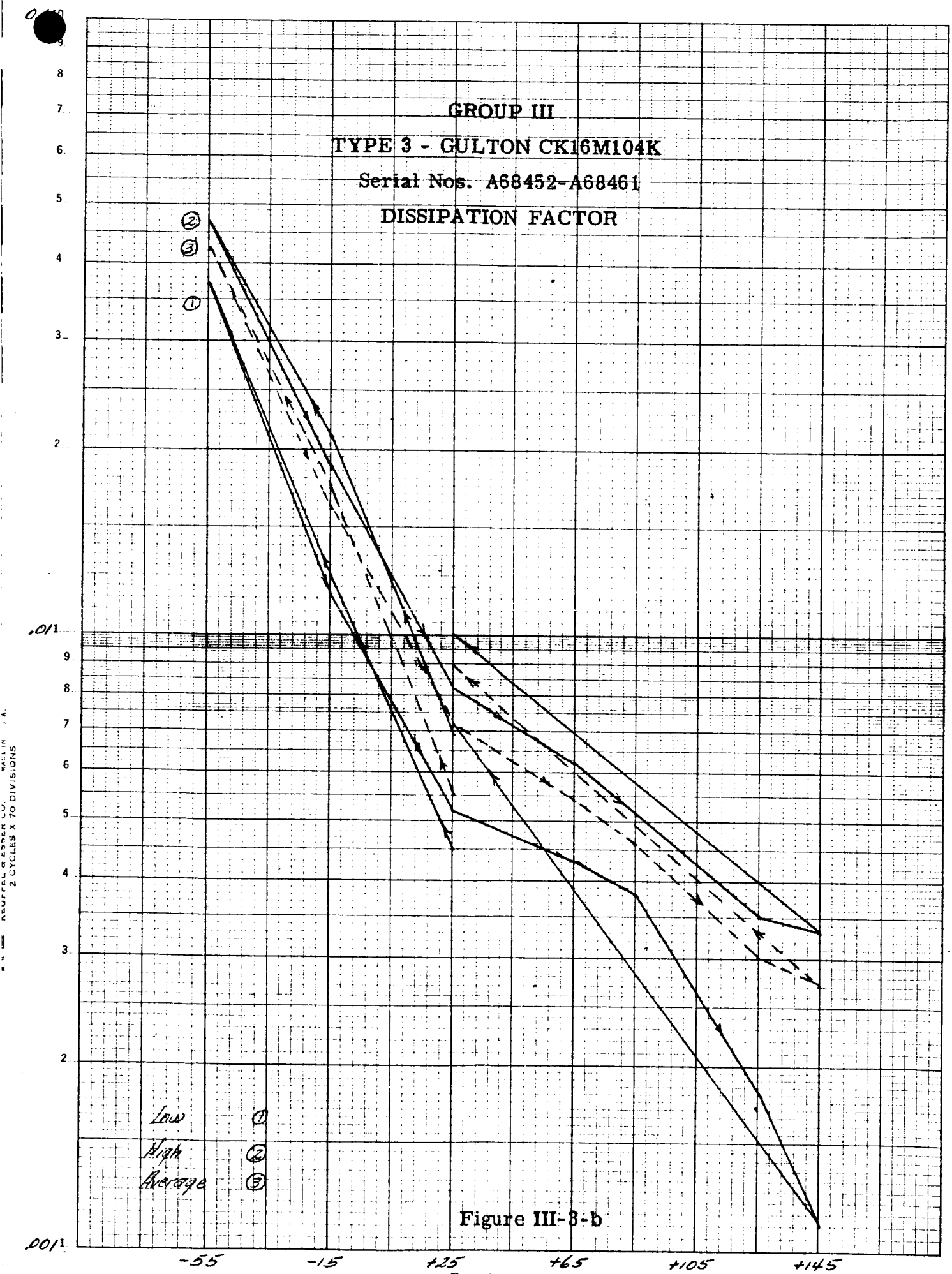


Figure III-3-b

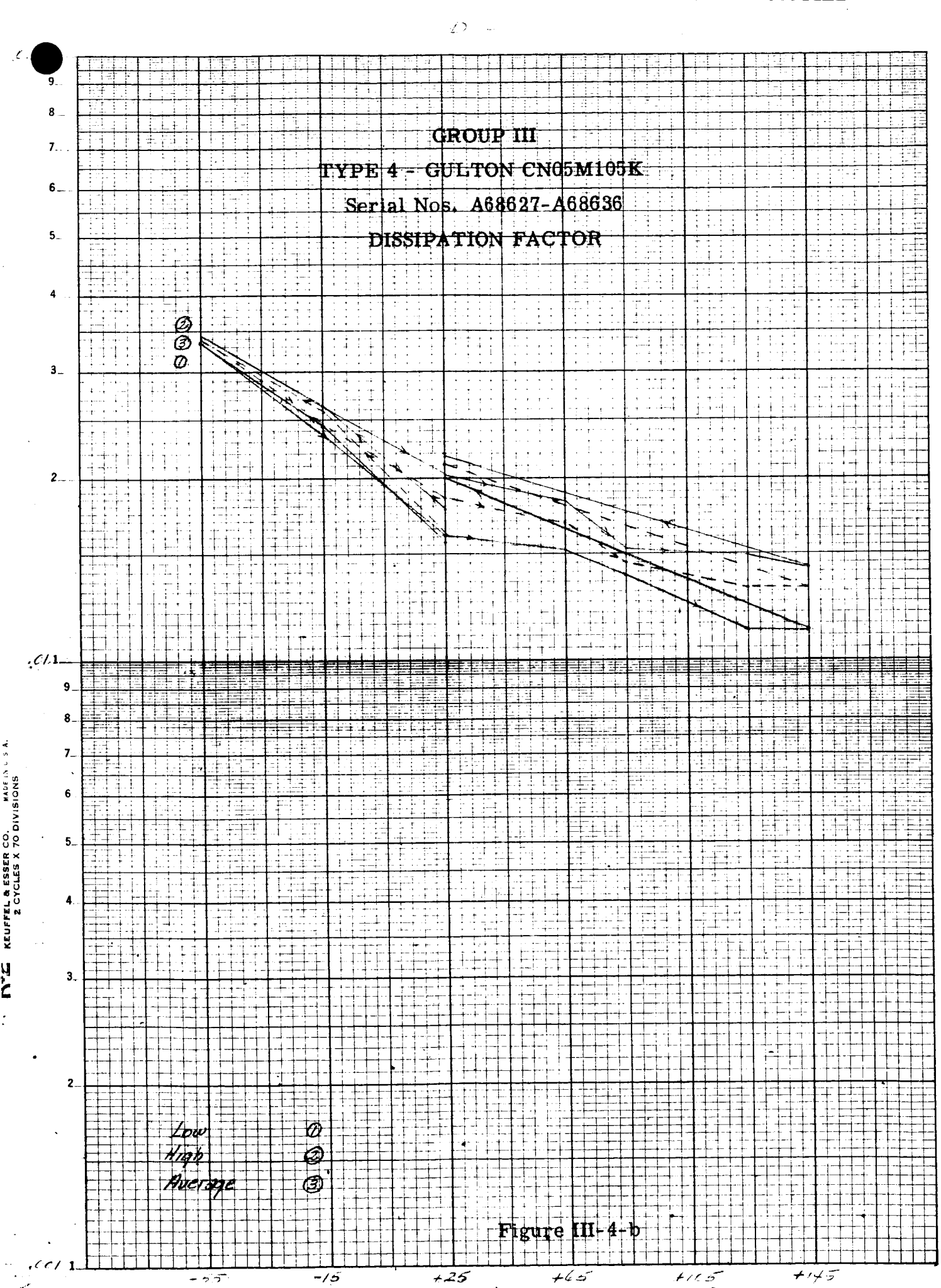


Figure III-4-b

D. F.

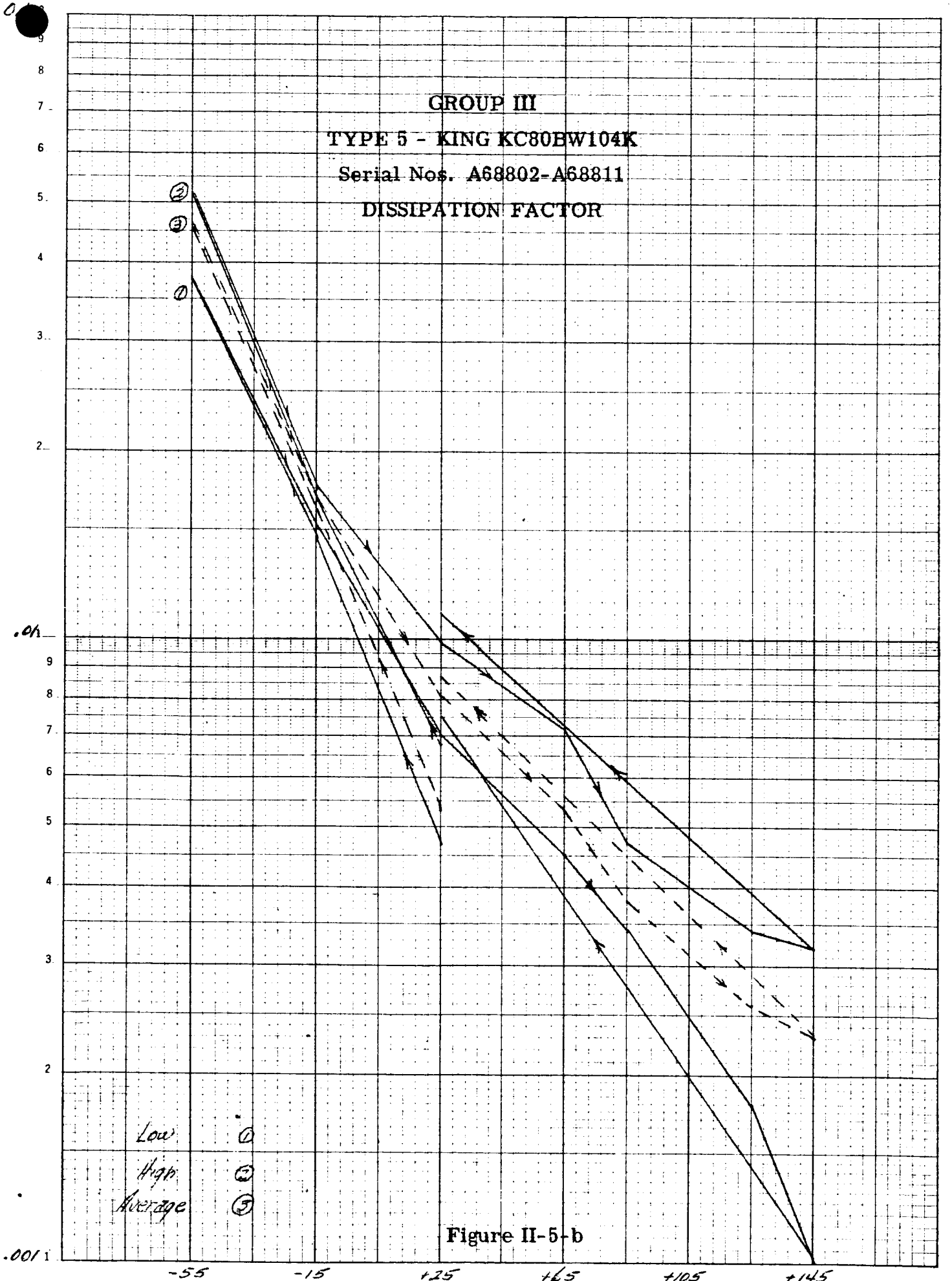


Figure II-5-b

 Centigrade

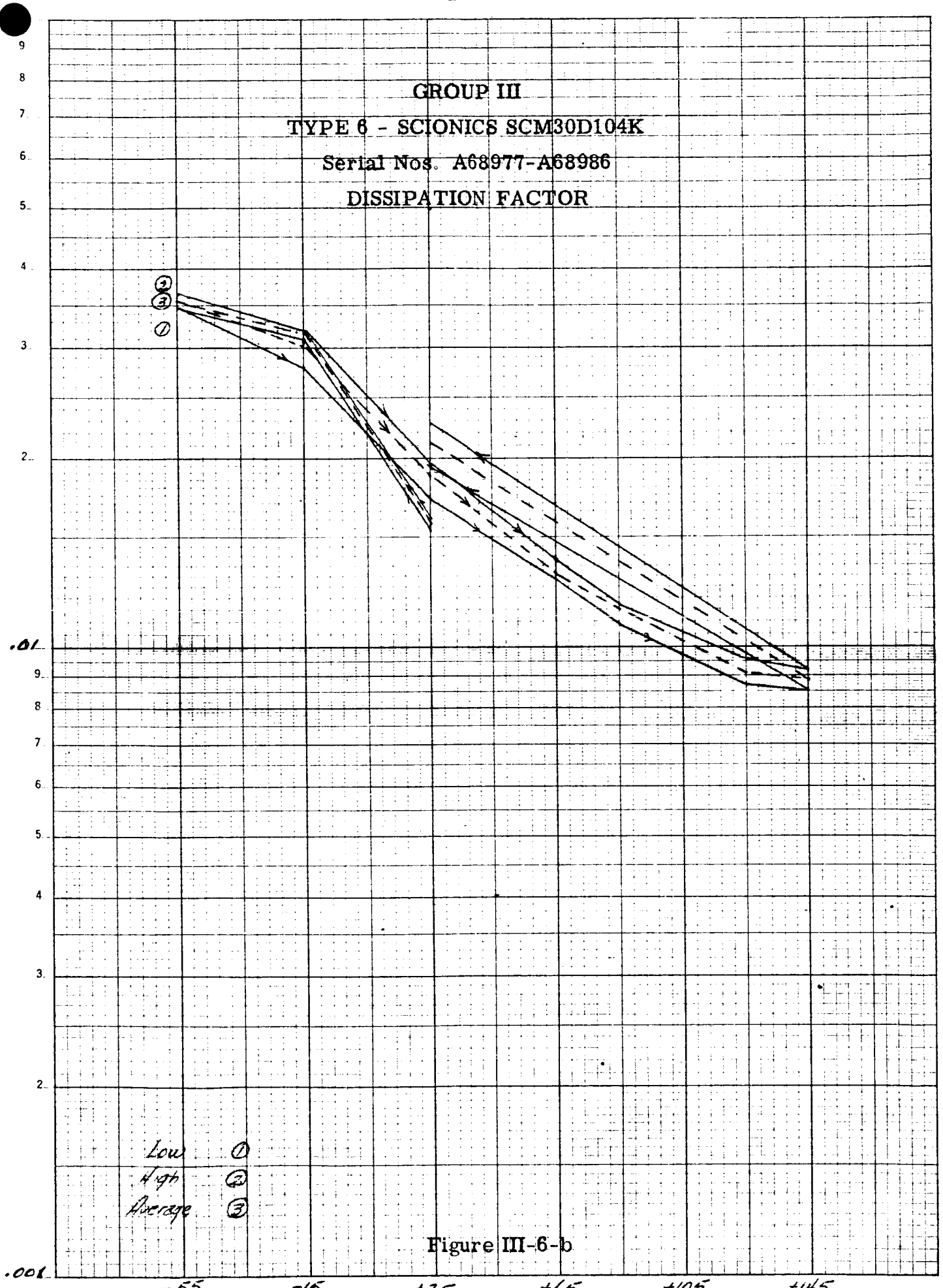
D. F.

GROUP III

TYPE 6 - SCIONICS SCM30D104K

Serial Nos. A68977-A68986

DISSIPATION FACTOR



KEUFFEL & ESSER CO. MADE IN U.S.A.
2 CYCLES X 70 DIVISIONS

Figure III-6-b

D. F.

GROUP III

TYPE 7 - ELECTRO-MATERIALS CORP. EK200R104K

Serial Nos. A69152=A69161

DISSIPATION FACTOR

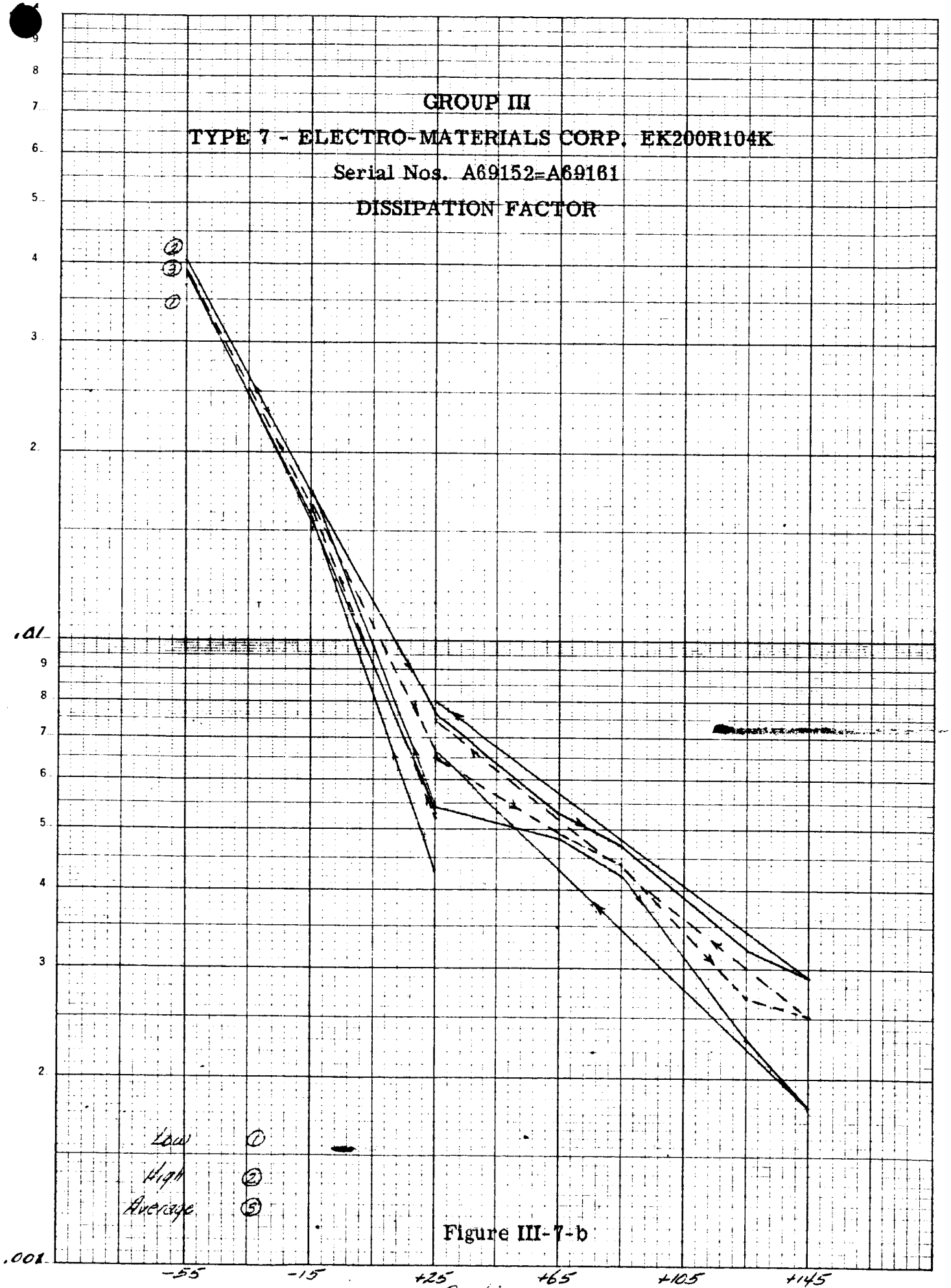


Figure III-7-b

D.F.

GROUP III

TYPE 8 - VITRAMON VL02BK103K

Serial Nos. A69327-A69336

DISSIPATION FACTOR

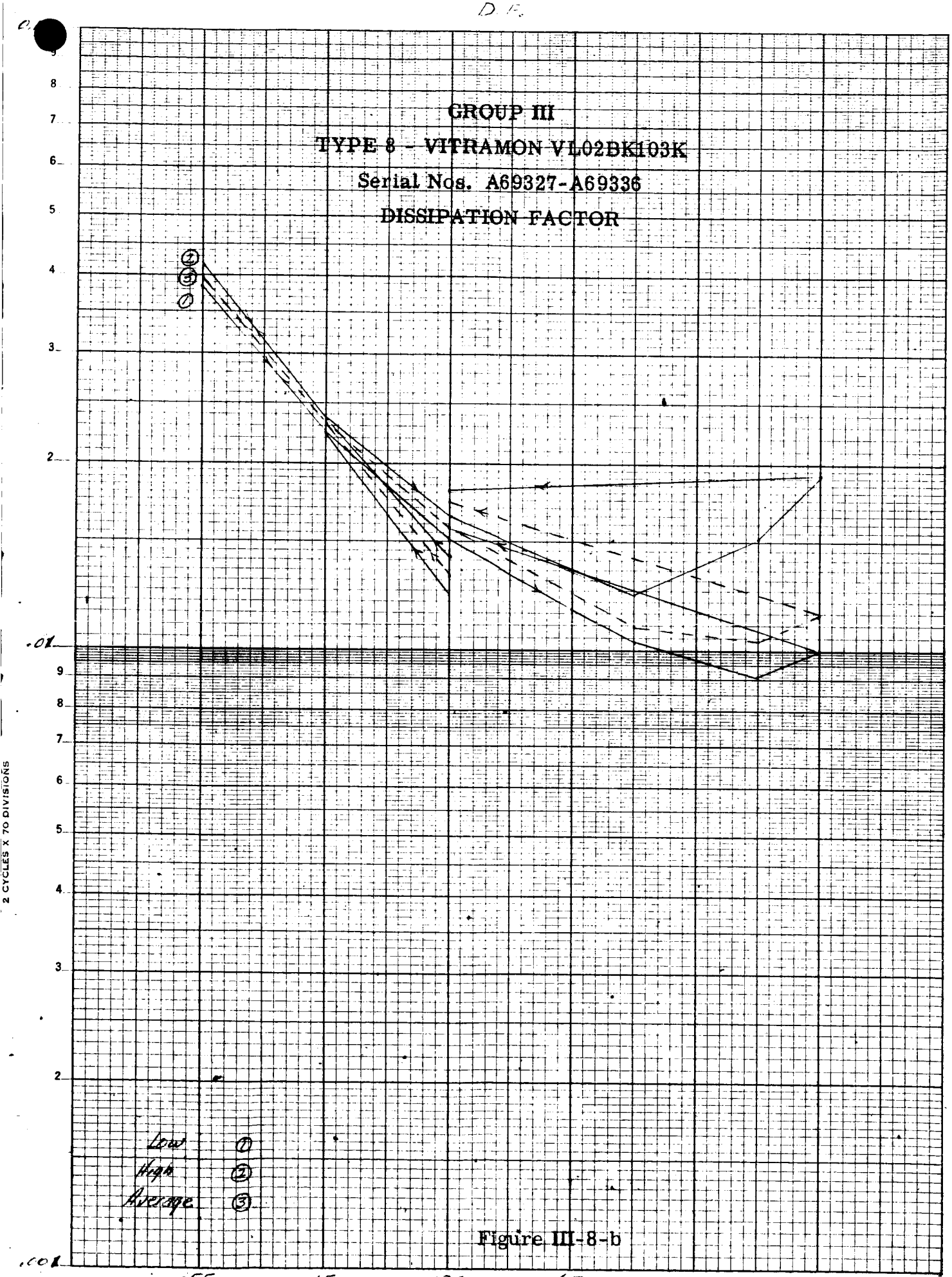


Figure III-8-b

Qualification

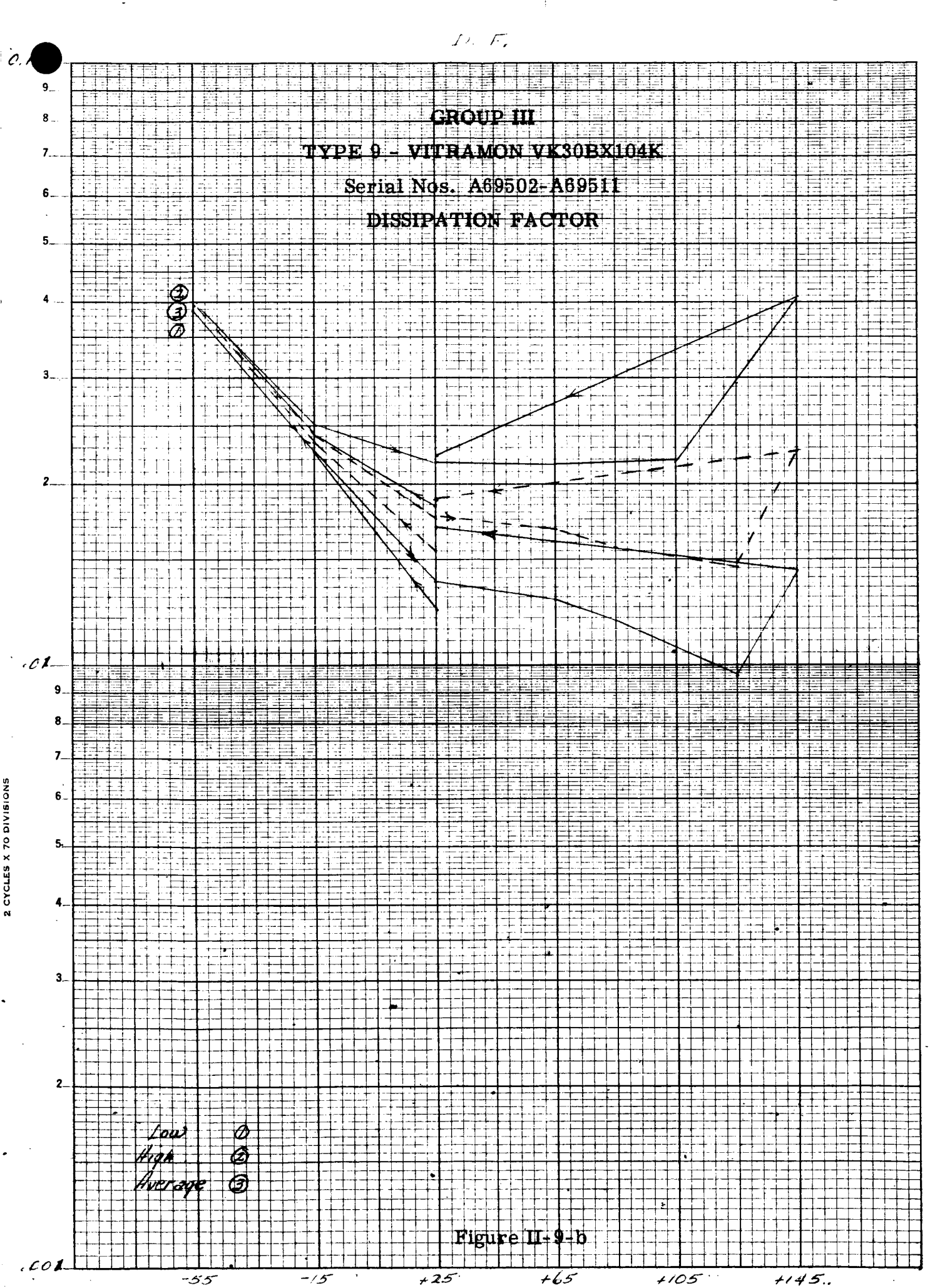

GROUP III
TYPE 9 - VITRAMON VK30BX104K
Serial Nos. A69502-A69511
DISSIPATION FACTOR
2 CYCLES X 70 DIVISIONS
Low ①
High ②
Average ③
-55
-15
+25
+65
+105
+145

Figure II-9-b

D. F.

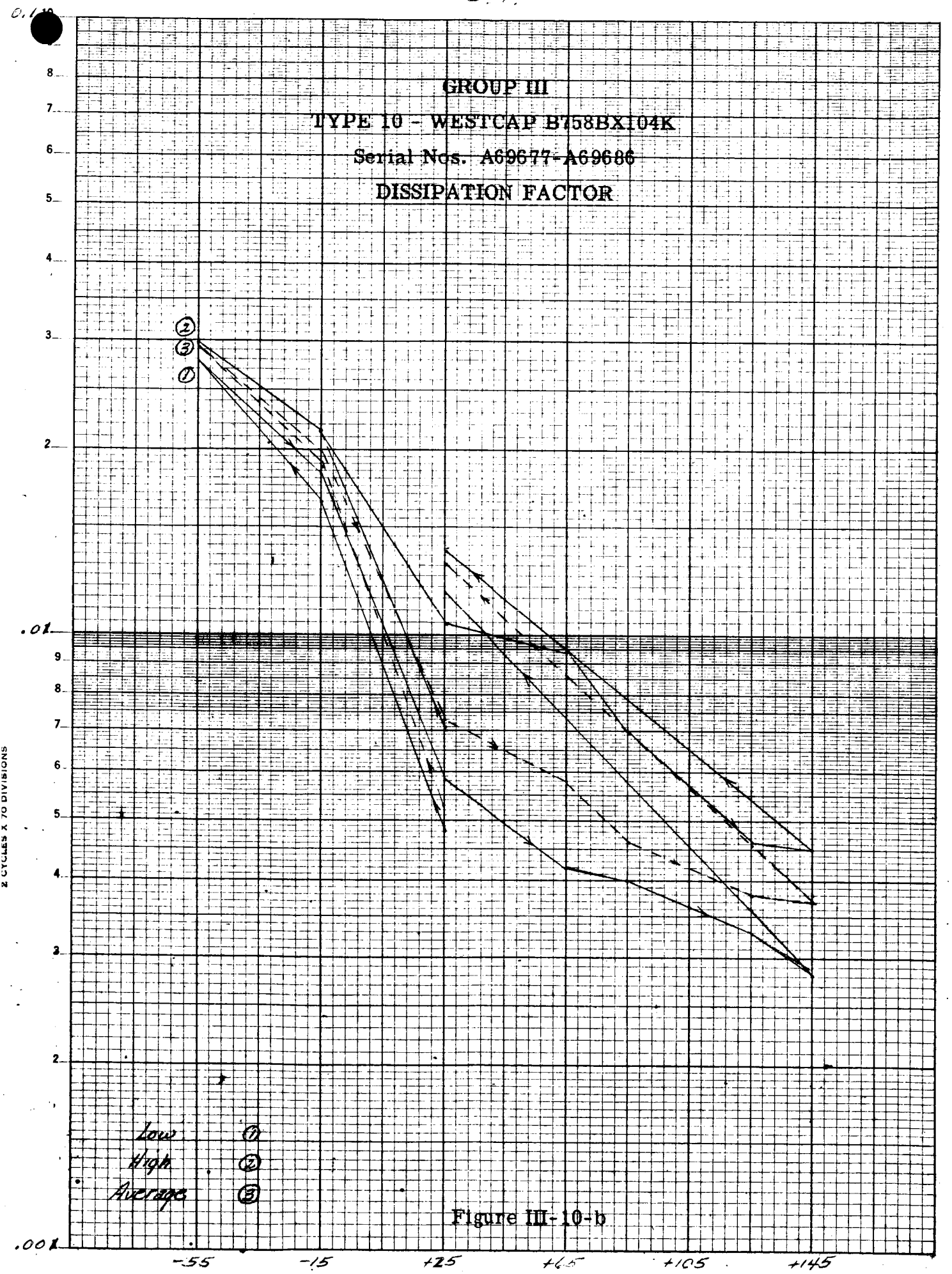
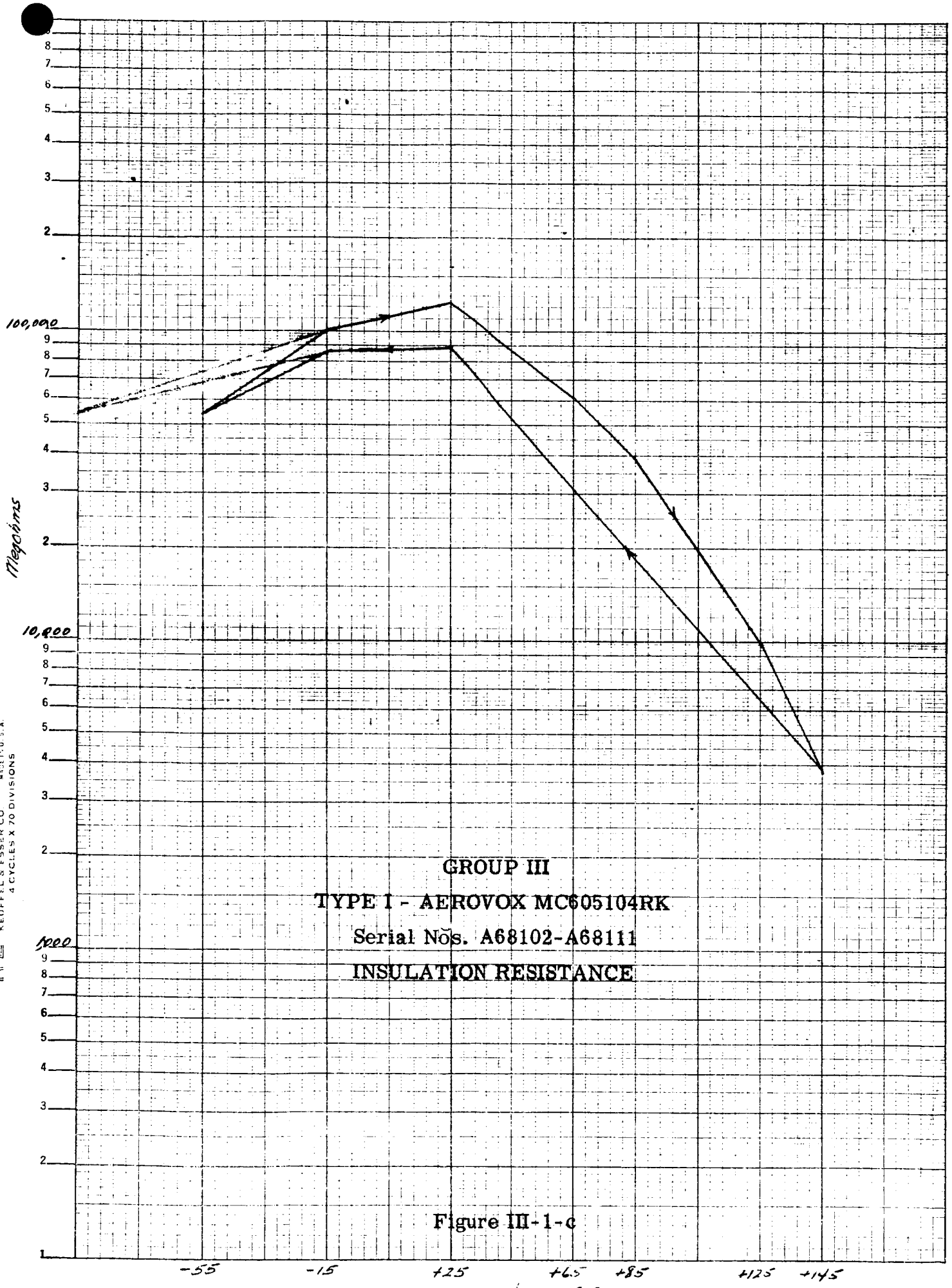


Figure III-10-b



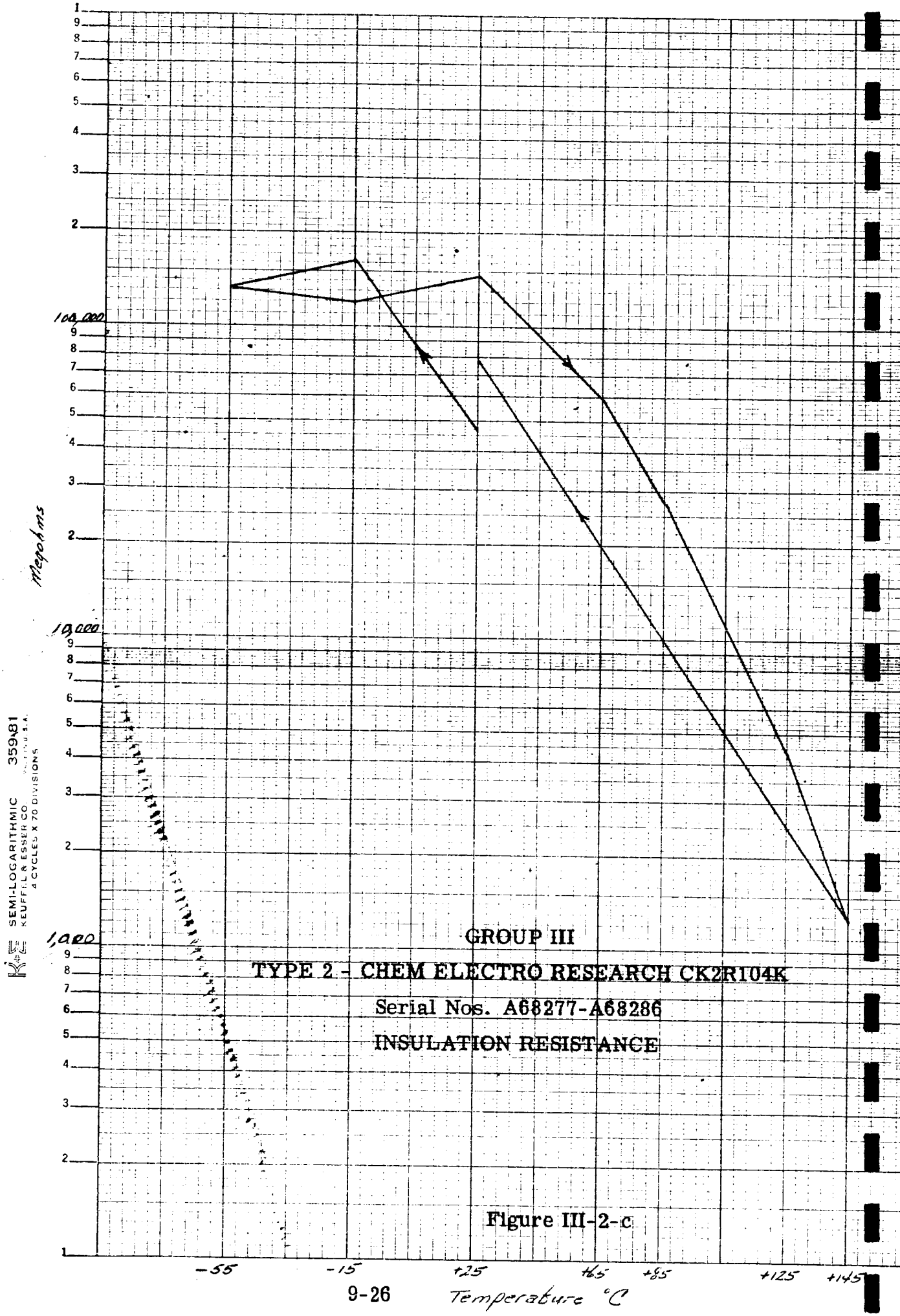
GROUP III

TYPE I - AEROVOX MC605104RK

Serial Nos. A68102-A68111

INSULATION RESISTANCE

Figure III-1-c



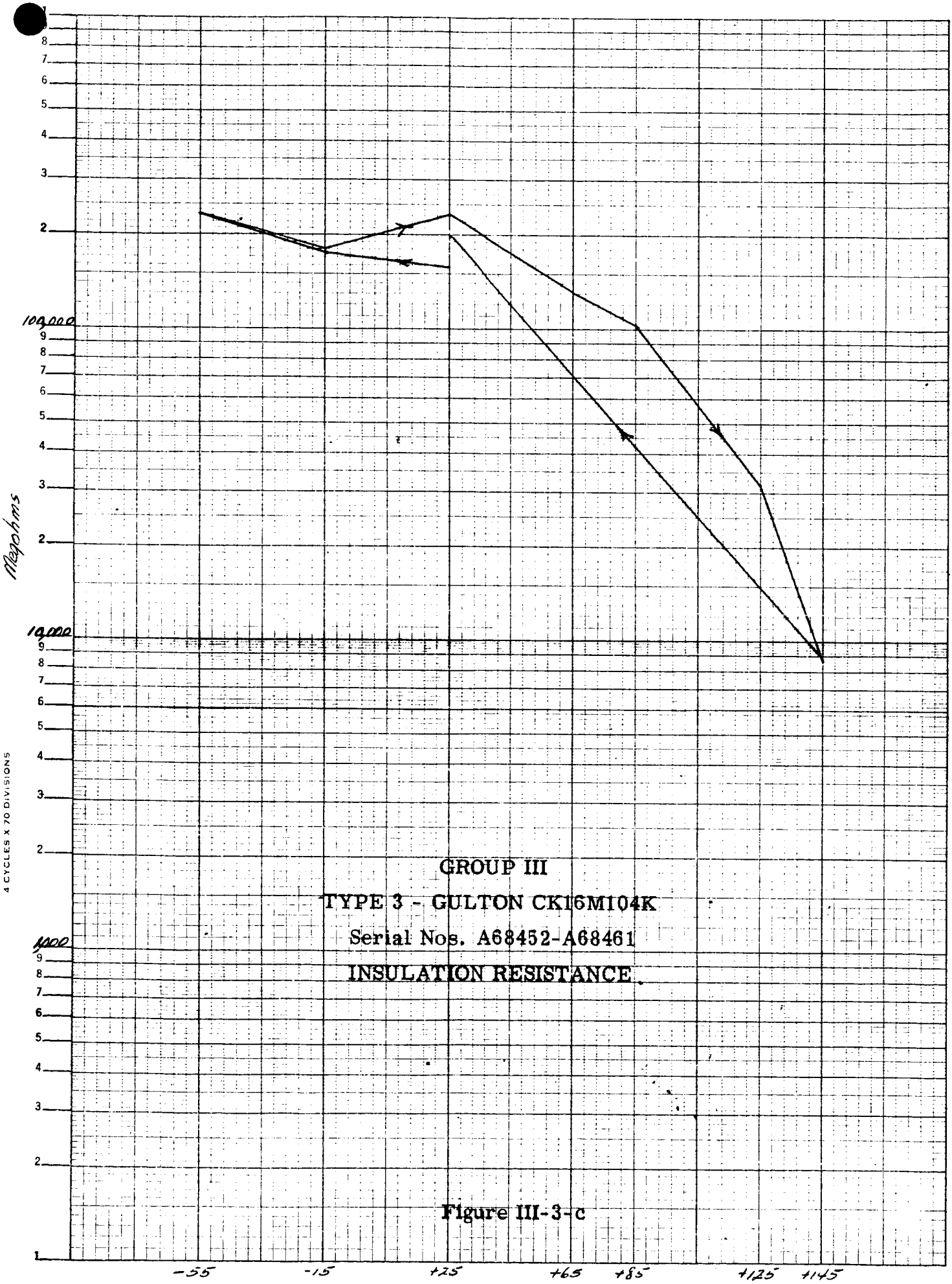
GROUP III

TYPE 2 - CHEM ELECTRO RESEARCH CK2R104K

Serial Nos. A68277-A68286

INSULATION RESISTANCE

Figure III-2-c



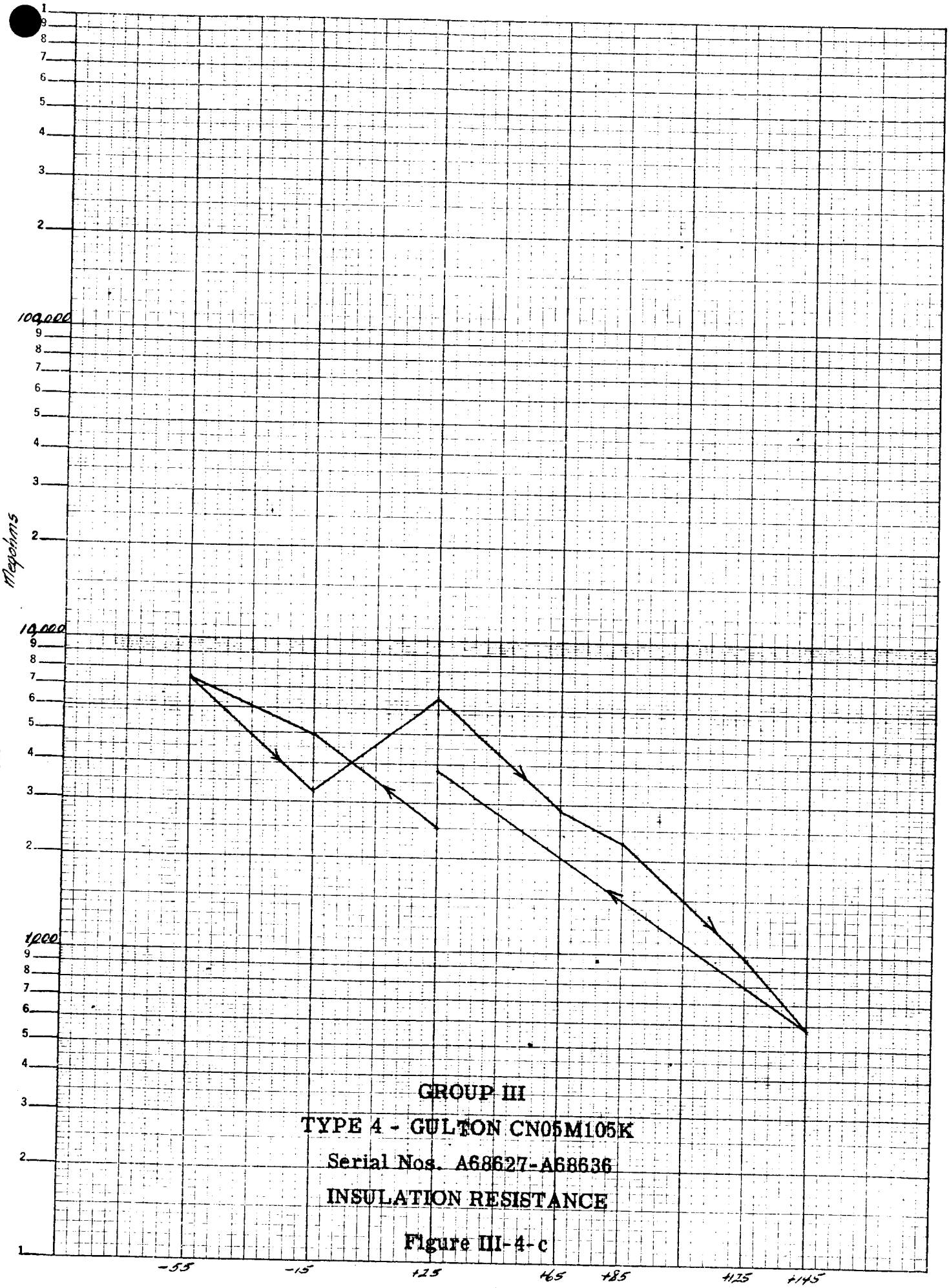
GROUP III

TYPE 3 - GULTON CK16M104K

Serial Nos. A68452-A68461

INSULATION RESISTANCE

Figure III-3-c



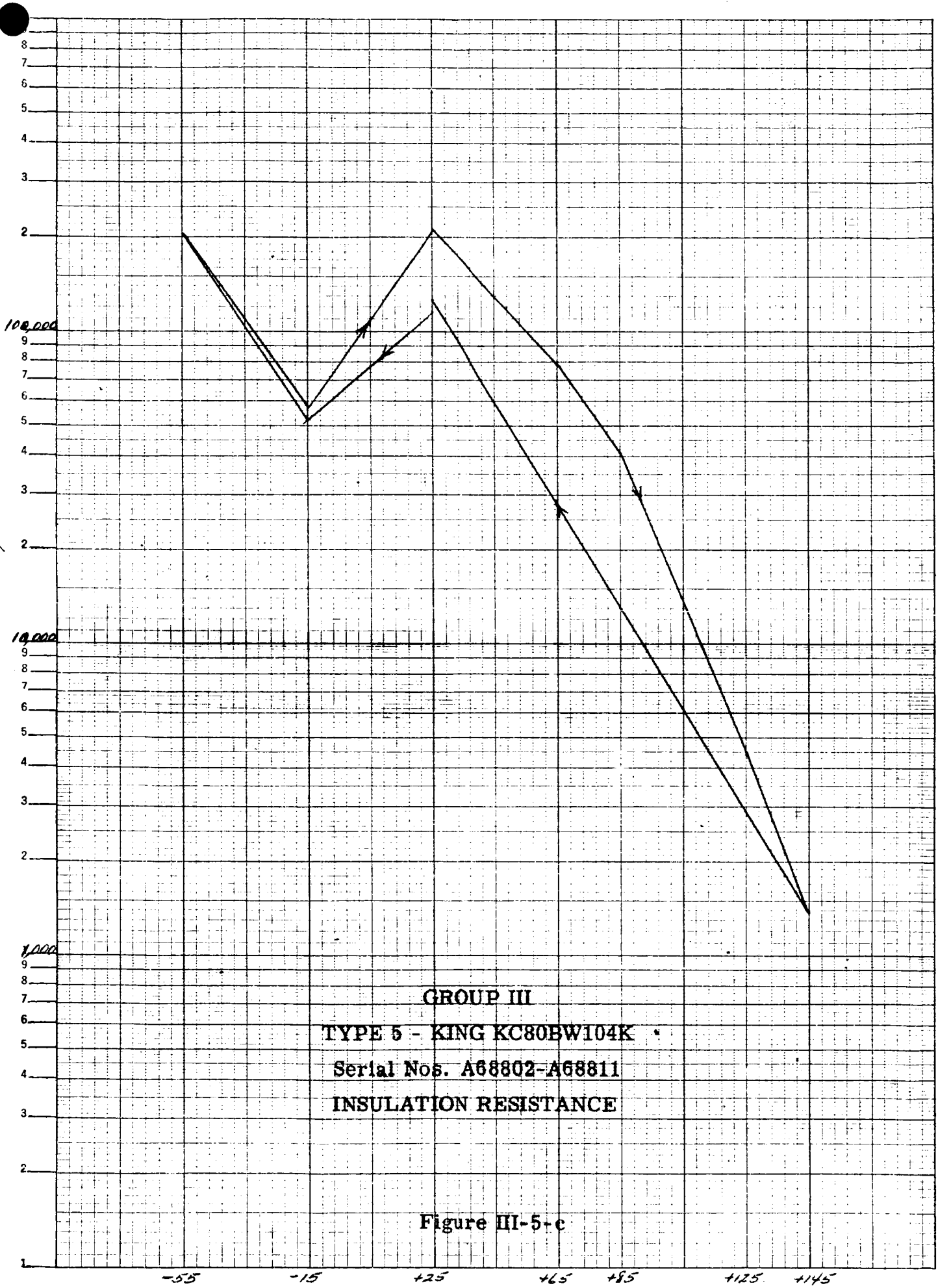
GROUP III

TYPE 4 - GULTON CN05M105K

Serial Nos. A68627-A68636

INSULATION RESISTANCE

Figure III-4-c



SEMI-LOGARITHMIC 359-81
KEUFFEL & ESSER CO.
4 CYCLES X 70 DIVISIONS

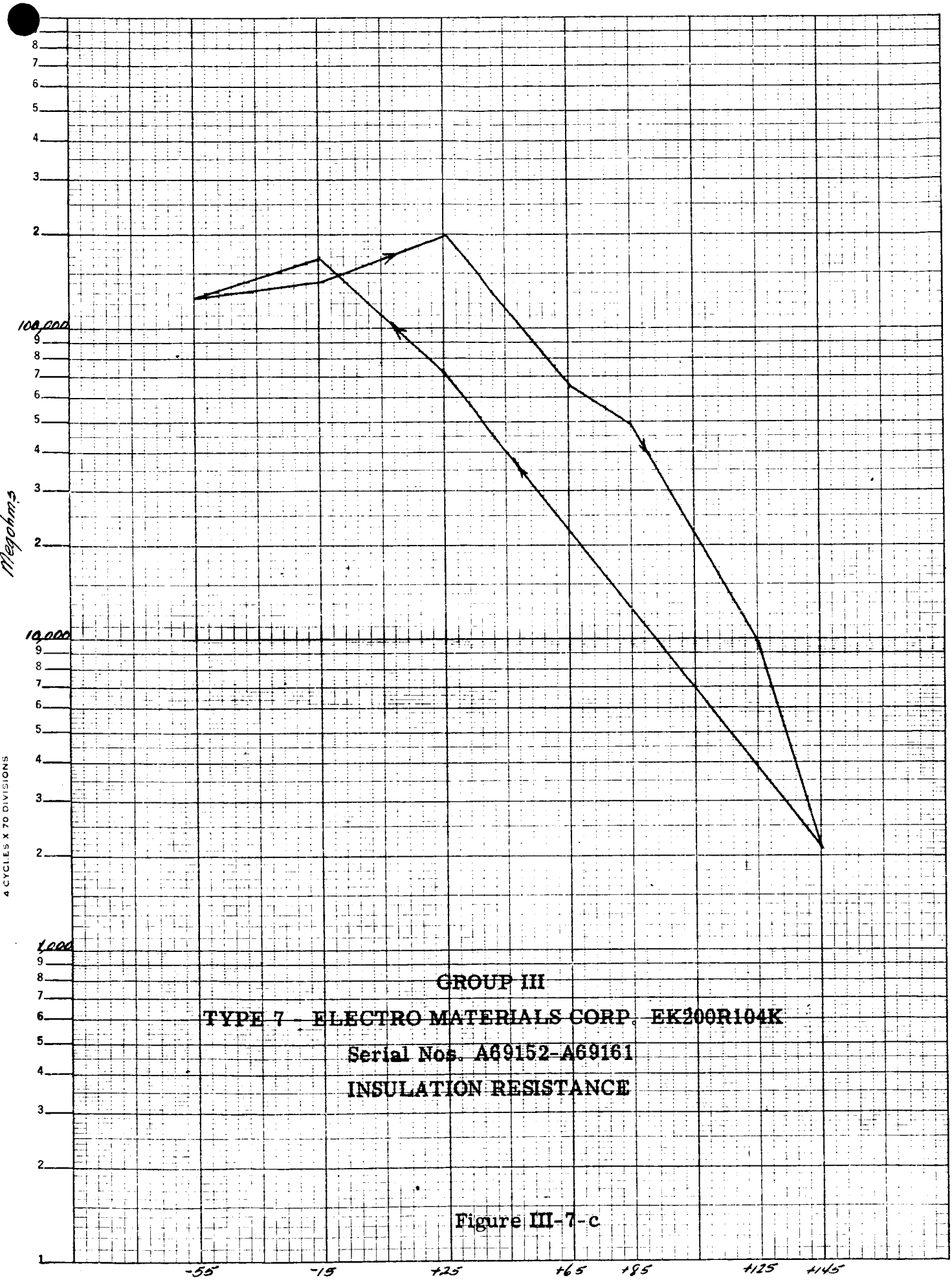
GROUP III

TYPE 5 - KING KC80BW104K

Serial Nos. A68802-A68811

INSULATION RESISTANCE

Figure III-5-c



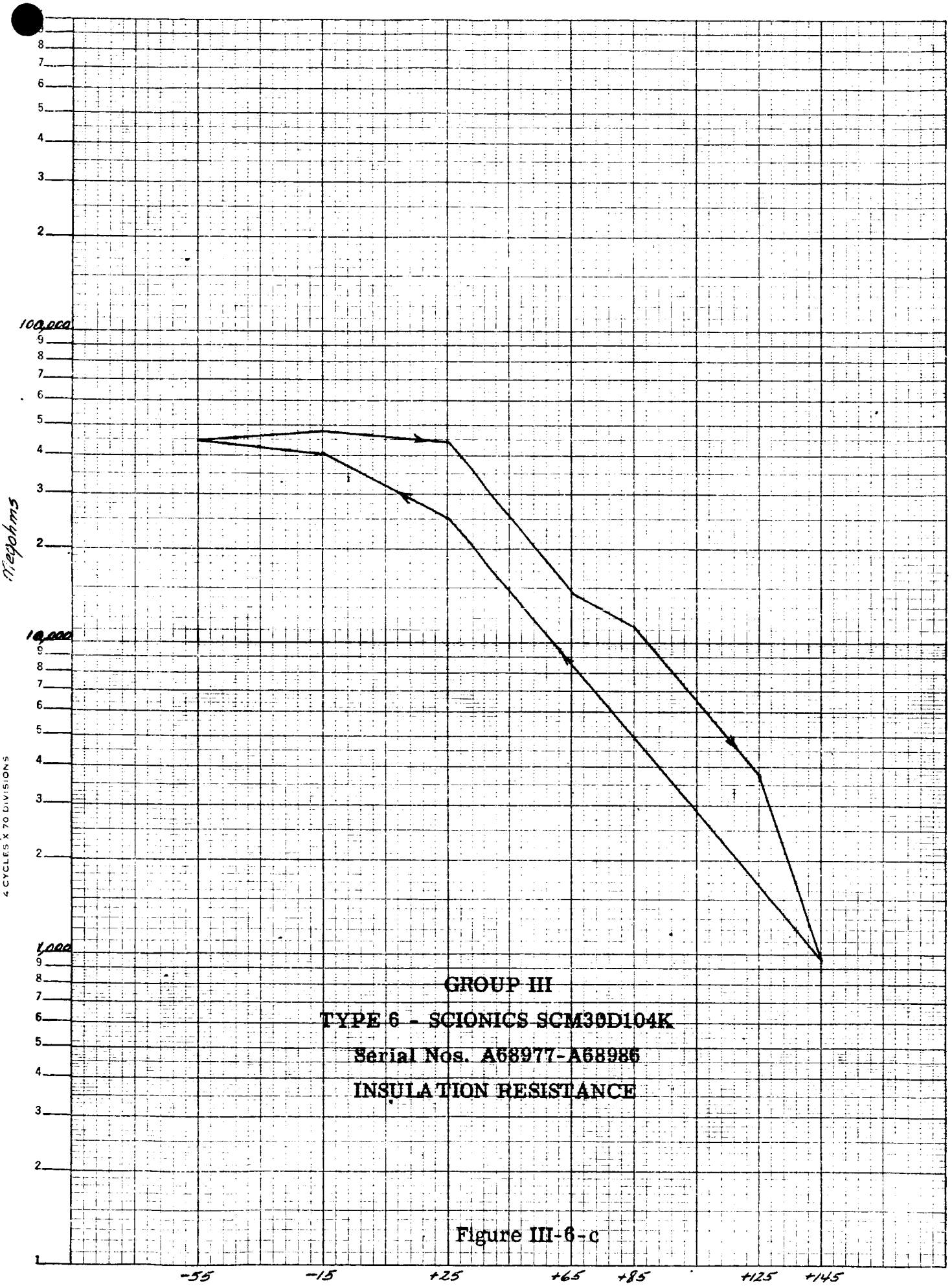
GROUP III

TYPE 7 - ELECTRO MATERIALS CORP. EK200R104K

Serial Nos. A69152-A69161

INSULATION RESISTANCE

Figure III-7-c



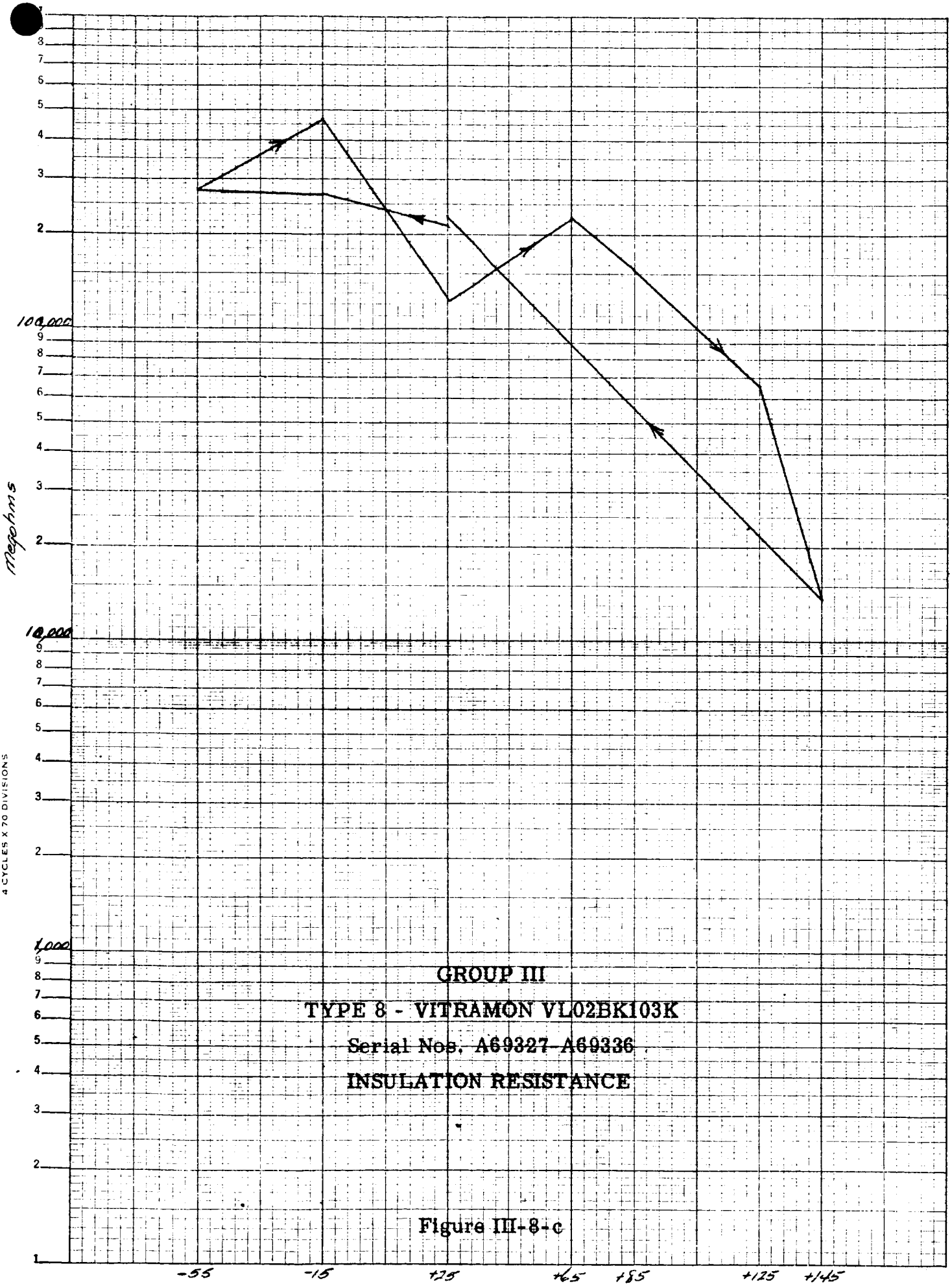
GROUP III

TYPE 6 - SCIONICS SCM30D104K

Serial Nos. A68977-A68986

INSULATION RESISTANCE

Figure III-6-c



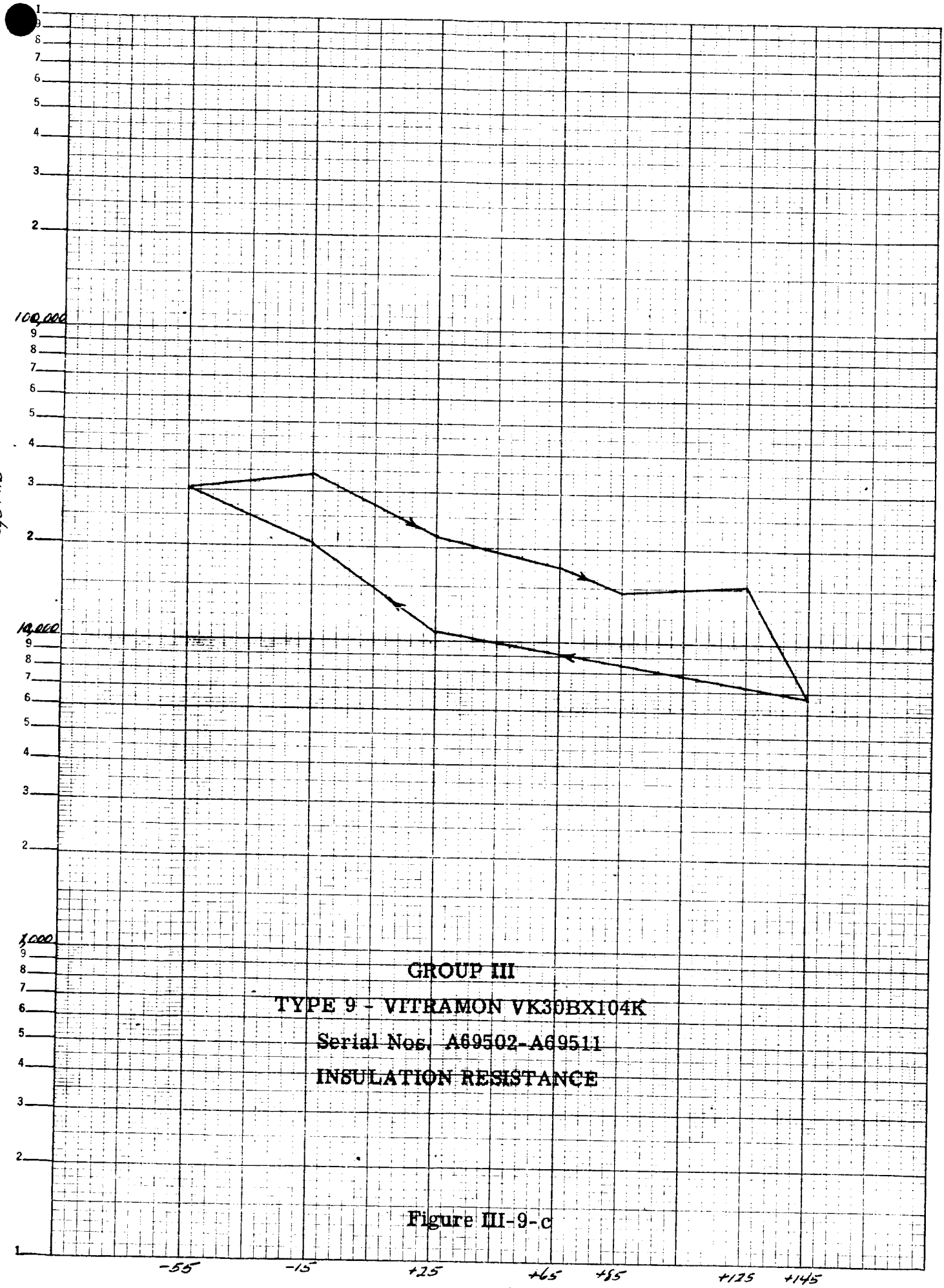
GROUP III

TYPE 8 - VITRAMON VL02BK103K

Serial Nos. A69327-A69336

INSULATION RESISTANCE

Figure III-8-c



GROUP III

TYPE 9 - VITRAMON VK30BX104K

Serial Nos. A69502-A69511

INSULATION RESISTANCE

Figure III-9-c

GROUP III

TYPE 10 - WESTCAP B758BX104K

Serial Nos. A69677-A69686

INSULATION RESISTANCE

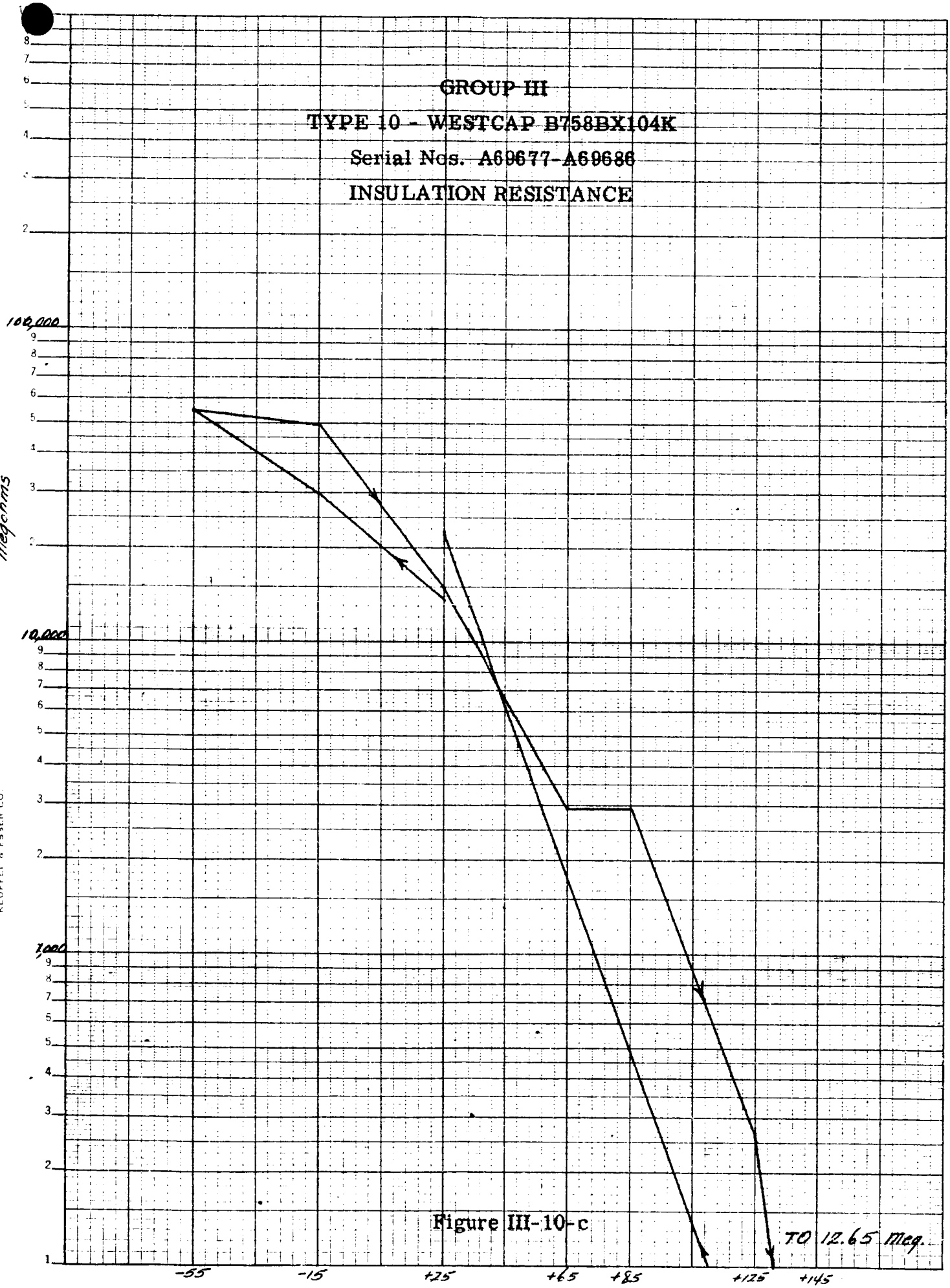


Figure III-10-c

GROUP IV - VOLTAGE BREAKDOWN TEST

This test was performed in accordance with paragraphs 4.2 and 4.5.2 of JPL Test Procedure #152.20-02 dated May 13, 1964. The apparatus used in this test was a Hewlett Packard 412A Vacuum Tube Voltmeter Serial #05485 equipped with a 2 to 1 voltage divider and a filtered DC power supply capable of output voltages in excess of 10,000 volts. The breakdown current was limited with a fast blow of 1/2 ampere fuse in series with each capacitor to prevent total destruction of the test specimen when failure occurred. In the case of the small Vitramon capacitors, the units did suffer severe mechanical destruction. Therefore, the 1/2 ampere fuse specified was reduced to a 1/8 ampere fast blow fuse. However, the units still were, for the most part, destroyed. Details of the test results are given below:

Chart #1 lists all of the Capacitors by serial number together with the voltage at which each capacitor suffered breakdown. Figures IV-A through IV-J are cumulative distributions of number of units plotted against breakdown voltage. It is to be noted that a considerable range of breakdown voltage exists even for capacitors having the same voltage ratings.

Following the Breakdown Test, Failure Analysis, in accordance with paragraph 4.9 of the Test Procedure was performed. The Failure Analysis proved to be somewhat difficult because of problems in disolving the various encapsulants used by the different capacitor manufacturers. First, attempts were made using Narmco Telesolv and Isochem Strip 708LV. Both of these solutions, given sufficient time, would dissolve all coating except those of Gulton and Scionic parts. Therefore, Epoxy Strip T51C was procured. This strip did successfully dissolve all of the encapsulants. However, as noted under the comments for individual specimens, the results were not

always satsifactory. Listed below is a tabulation of comments concerning the various parts together with the results of the failure analyses.

Part Type #1 - Aerovox 605104RK - Encapsulation is accomplished by filling a molded cup with plastic material. Internal assembly of the leads and elements is by means of soldering flattened leads along the sides of the ceramic elements. These parts are strong mechanically and no parts fell apart or were otherwise damaged during opening. The following observations are pertinent to the specific parts tested.

Serial #A68112 - Dark cracks are noted to propagate from contacts on one side.

Serial #A68113 - Crazing and cracking on one side propagating from contacts.

Serial #A68114 - Deep hole in top center of element. This hole was observed prior to depotting and occurred at breakdown when the case fractured.

Serial #A68115 - Light crack in element.

Serial #A68116 - Small circular cracks, bottom side of element.

Serial #A68117 - Fine cracks in one side which appear to be propagating from contacts.

Serial #A68118 - Cracked near contact.

Serial #A68119 - Deep cracks in one side propagating from contacts.

Serial #A68120 - Long crack in element.

Serial #A68121 - Small hole in approximate center of one side.

It is to be noted that in this type of unit the cracks generally appear to generate either from or in the vicinity of contacts. There does not appear to be any particular correlation between resultant observed damage and observed value of breakdown voltage.

Part Type #2 - Chem-Electro Research CK2R104K - These parts are encapsulated by filling a molded cup with the encapsulant. Lead attachment to the element is by means of formed nailhead type leads. This construction seems to be weak, as not one part remained intact after dissolving the encapsulating material. However, and as noted in detail below, all of the lead failures were by separation of the metallic material attached to the ceramic, rather than by the leads detaching from the material plated to the internal element.

Serial #A68287 - One lead intact. Element appeared to have blown under the contact adjacent to missing lead. Lead bond was good. The plating for the element pulled away with the lead.

Serial #A68288 - Same comment on lead separation as above. Failure occurred within element, however, as evidenced by deep circular cracks on one side of element.

Serial #A68289 - Both leads separated. Failure is evidenced by circular cracks per above only adjacent to contacts.

Serial #A68290 - One separated lead. Large cracks propagate from one contact, indicating failure.

Serial A68291 - Both leads separated. Sector cracks visible on one side.

Serial #A68292 - Same comment as above, except wider propagation cracks.

Serial #A68293 - In addition to the deep crack, unit exhibits burning near one contact, indicating possibility of multiple breakdown.

Serial #A68294 - Element is fractured. Center of fracture appears to be in approximate center of body, indicating where breakdown occurred.

Serial #A68295 - Visible circular failure surrounded by cracks on one side.

Serial #A68296 - Deep failure in center of element.

It is to be noted that contrary to the results achieved on the Aerovox parts, failures on these parts are characteristically in the center of the unit. Here again, no particular correlation is observed between voltage breakdown and apparent severity of fracture.

Part Type #3 - Gulton CK16M104K - Encapsulation is by molding. Material is very durable requiring approximately two weeks in Epoxy Strip to dissolve. Lead attachment consists of soldering flattened leads to contacts along sides. Mechanically these units are very strong.

Serial #A68462 - No apparent damage.

Serial #A68463 - No apparent damage.

Serial #A68464 - No apparent damage.

Serial #A68465 - Light circular cracks on one side.

Serial #A68466 - Marked circular cracks on one side.

Serial #A68467 - No apparent damage.

Serial #A68468 - No apparent damage.

Serial #A68469 - No apparent damage.

Serial #A68470 - Small light circular cracks on one side. No apparent other damage.

Serial #A68471 - No apparent damage. Element fractured in depotting.

From the above it is obvious that most of the failures of this type part are internal to the part and that the part is constructed very well. Half of the parts exhibited no external evidence of failure.

Part Type #4 - Gulton CN05M105K - Units are molded of a similar compound to part #3. Like parts #3, these units were extremely difficult to dissolve, requiring three to four weeks. The mechanical construction of these units is very rugged. Leads are affixed to large nailheads which are apparently soldered to the active element. It should be noted that the long cycle in the solution caused a considerable amount of corrosion of the metal parts and may have contributed to some of the observations below regarding cracking and separation.

Serial #A68637 - Exhibit separation of outer layers of element.
Serial #A68638 - Same as A68637.
Serial #A68639 - Light cracks are visible.
Serial #A68640 - Same as A68637.
Serial #A68641 - Sames as A68637.
Serial #A68642 - Same as A68639.
Serial #A68643 - Sames as A68637.
Serial #A68644 - Same as A68637.
Serial #A68645 - Same as A68637.
Serial #A68646 - Same as A68637.

Thus, it can be seen that little was learned except that possibly the long cycle of dissolving caused certain bad effects upon the capacitor elements.

Part Type #5 - King KC80BW104K - Encapsulation of these parts was accomplished by filling a molded cup with the potting material. Lead attachment is by means of soldering leads along the side of the element. Elements are approximately the same sizes as Types 1, 2 and 3 above, but the case, however, is somewhat larger.

Serial #A68812 - Element exhibits cracks radiating from contact area on one side. Some damage also seen on reverse side.

Serial #A68813 - Cracks on both sides.

Serial #A68814 - Cracks on both sides. Unit was partially destroyed mechanically in the test.

Serial #A68815 - Element fractured. Separation of dielectric layers apparent.

Serial #A68816 - Visible crater in element from explosion of inside.

Serial #A68817 - No apparent damage.

Serial #A68818 - Visible craters in element similar to A68816 above.

Serial #A68819 - Same as A68818 above.

Serial #A68820 - Part was damaged in depotting. Failure per se is not apparent.

Serial #A68821 - Some cracking visible. Probably due to the dissection. Failure is not visible.

Part Type #6 - Scionics SCM30D104K - These units are molded and attempts to dissolve the units and maintain mechanical integrity of the active element were not successful. If the units were left in the solvent long enough to reach the element, the element came apart. Thesefore, only bits and pieces remained of the units which were destroyed. Attempts to dissolve the remainder of the units were stopped. In the units which were destroyed the lead attachment does appear to be very strong, however.

Part Type #7 - Electro Materials Corp. EK200R104K. - Encapsulation is by means of filling a molded case with encapsulant. Leads are nailhead types soldered to the element. Soldering is, in certain cases, somewhat strengthened by the effective attachment area being reinforced by means of excess solder. This particular technique, however, was not consistent nor apparent in all parts.

Serial #A69162 - Small cracks visible on one side.

Serial #A69163 - Small cracks visible on one side.

Serial #A69164 - Deep crater started on one side.

Serial #69165 - One lead separated. Crack in one side starting at contact.

Serial #A69166 - One lead separated, otherwise no apparent damage.

Serial #A69167 - One lead separated. Crack in one side.

Serial #A69168 - Small clean crater is visible on one side. This crater apparently eminates from the point of initial failure.

Serial #A69169 - No apparent damage.

Serial #A69170 - Light cracks visible on one side.

Serial #A69171 - Light cracks visible on one side.

Part Type #8 - Vitramon VL02BK103K - These parts appear to be moded. Of all the units in the test, they exhibited the highest breakdown voltage which correlates somewhat to the 200 volt rating. The breakdown on these parts was very violent in nature and its effect on the units so great that the dissection of the units was not considered necessary. In conducting the test, after the first two parts, 1/8 ampere fast blow fuses were used in an attempt to limit the destruction of the specimens. However, in the case of the A69343 and A69344 parts, these parts, including leads, were blown out of the test fixture and not recovered.

Serial #A69337 - Side of case is blown. Layers of dielectric are spread.

Serial #A69338 - Same as A69337.

Serial #A69339 - Layers spread. Unit broken into two parts.

Serial #A69340 - Hole in side of case, crack of element visible.

Serial #A69341 - Same as A69337.

Serial #A69342 - Same as A69337.

Serial #A69343 - Lost in the test.

Serial #A69344 - Lost in the test.

Serial #A69345 - Hole in side of case, separation of layers.

Serial #A69346 - Same as A69345.

In view of all the above damage the integrity of the contacts appears to be good, as no contact separation was noted.

Part Type #9 - Vitramon VK30BX104K - Units are encapsulated by filling a molded cup with a capsulating compound. Sharply flattened leads are soldered along the side of the element. These leads are flattened so sharply that some stress concentration is apparent, as one lead was broken in handling. Also, it is to be noted that parts appear to be dipped in a transparent jell type material prior to final encapsulation.

Serial #A69512 - No apparent damage.

Serial #A69513 - Light cracks are visible on one side.

Serial #A69514 - No apparent damage.

Serial #A69515 - No apparent damage.

Serial #69516 - No apparent damage.

Serial #A69517 - One lead broken in handling. Otherwise, no apparent damage.

Serial #A69518 - No apparent damage.

Serial #A69519 - No apparent damage.

Serial #A69520 - No apparent damage.

Serial #A69521 - No apparent damage.

Since little internal damage can be observed upon these parts, it is apparent that the element itself must be extremely well constructed and of great strength. Thus, further sectioning work would be necessary to find the actual place the failure occurred.

Part Type #10 - Westcap B758BX104K - Encapsulation is by means of filling a molded cup with the encapsulant. Leads are flattened and formed to permit soldering along the sides of the element.

Serial #A69687 - A complete separation of one side of the element can be observed.

Serial #A69688 - Similar to A69687. Also a visible crater and cracks in the element can be observed.

Serial #A69689 - Element is fractured and visible cracks and separations are apparent.

Serial #A69690 - Large area separation. Craters or burns are visible at the bottom of the element.

Serial #A69691 - Fine cracks visible. No other apparent damage.

Serial #A69692 - Element is fractured.

Serial #A69693 - Edge cracks are visible. No other apparent damage.

Serial #A69694 - Crater and edge cracks are visible on one side.

Serial #A69695 - Same as A69694.

Serial #A69696 - A large separation of one side of the entire area.

It is to be noted from the above observations that these parts tend to separate over a large area, more so than any other parts in the test, indicating the mechanical construction of the element, on a comparative basis, is not as strong as the other parts tested.

GROUP IV - VOLTAGE BREAKDOWN

Aerovox - MC605104RK

Serial No.	Voltage Breakdown
A68112	1660
A68113	1600
A68114	1700
A68115	2000
A68116	2500
A68117	2010
A68118	1630
A68119	1620
A68120	1660
A68121	740

Chem-Electro Research - CK2R104K

Serial No.	Voltage Breakdown
A68287	1011
A68288	947
A68289	1020
A68290	1370
A68291	940
A68292	1080
A68293	1020
A68294	1120
A68295	1220
A68296	1100

Gulton - CK16M104K

Serial No.	Voltage Breakdown
A68462	1260
A68463	1160
A68464	840
A68465	1020
A68466	1100
A68467	1120
A68468	880
A68469	760
A68470	1250
A68471	1250

Gulton - CN05M105K

Serial No.	Voltage Breakdown
A68637	490
A68638	510
A68639	380
A68640	620
A68641	520
A68642	490
A68643	270
A68644	390
A68645	460
A68646	540

King Electric - KC80BW104K

Serial No.	Voltage Breakdown
A68812	1060
A68813	940
A68814	640
A68815	1180
A68816	1020
A68817	580
A68818	1080
A68819	1300
A68820	760
A68821	700

Scionics - SCM30D104K

Serial No.	Voltage Breakdown
A68987	420
A68988	1200
A68989	760
A68990	1050
A68991	700
A68992	590
A68993	900
A68994	870
A68995	800
A68996	520

Electro Materials Corp. - EK200R104K

Serial No.	Voltage Breakdown
A69162	1120
A69163	1060
A69164	1200
A69165	1160
A69166	1140
A69167	1020
A69168	1080
A69169	820
A69170	920
A69171	1100

Vitramon - VK30BX104K

Serial No.	Voltage Breakdown
A69512	660
A69513	300
A69514	820
A69515	770
A69516	600
A69517	640
A69518	480
A69519	1240
A69520	520
A69521	640

Vitramon - VL02BK103K

Serial No.	Voltage Breakdown
A69337	2200
A69338	1300
A69339	2200
A69340	3600
A69341	2100
A69342	2000
A69343	1800
A69344	2000
A69345	2400
A69346	2600

Westcap - B758BX104K

Serial No.	Voltage Breakdown
A69687	910
A69688	380
A69689	540
A69690	420
A69691	470
A69692	500
A69693	610
A69694	760
A69695	770
A69696	620

Group IV
Type 1 - Aerovox MC605104RK
Serial Nos. A68112-A68121
Voltage Breakdown

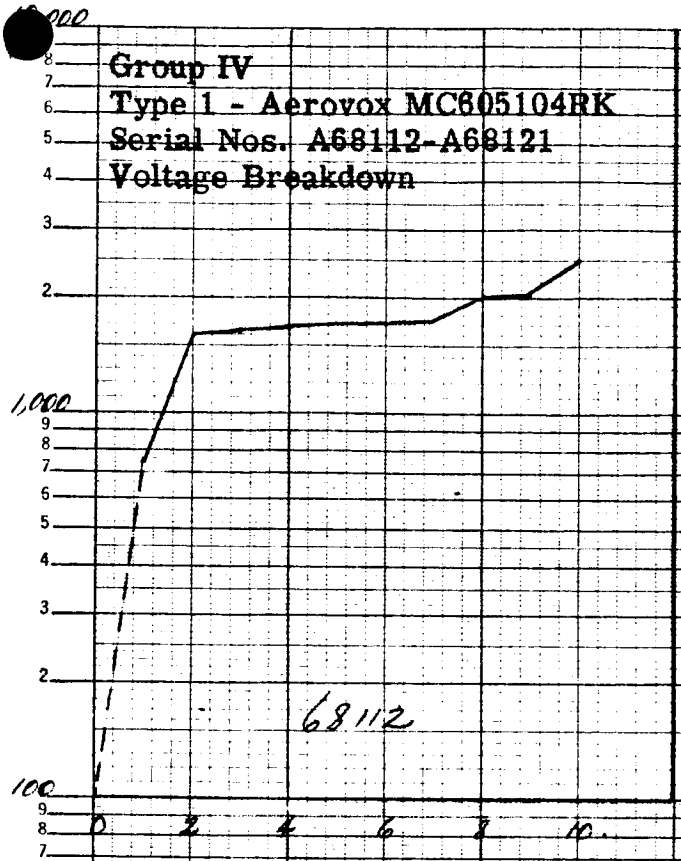


Figure IV-A

Group IV
Type 2 - Chem-Electro CK2R104K
Serial Nos. A68287-A68296
Voltage Breakdown

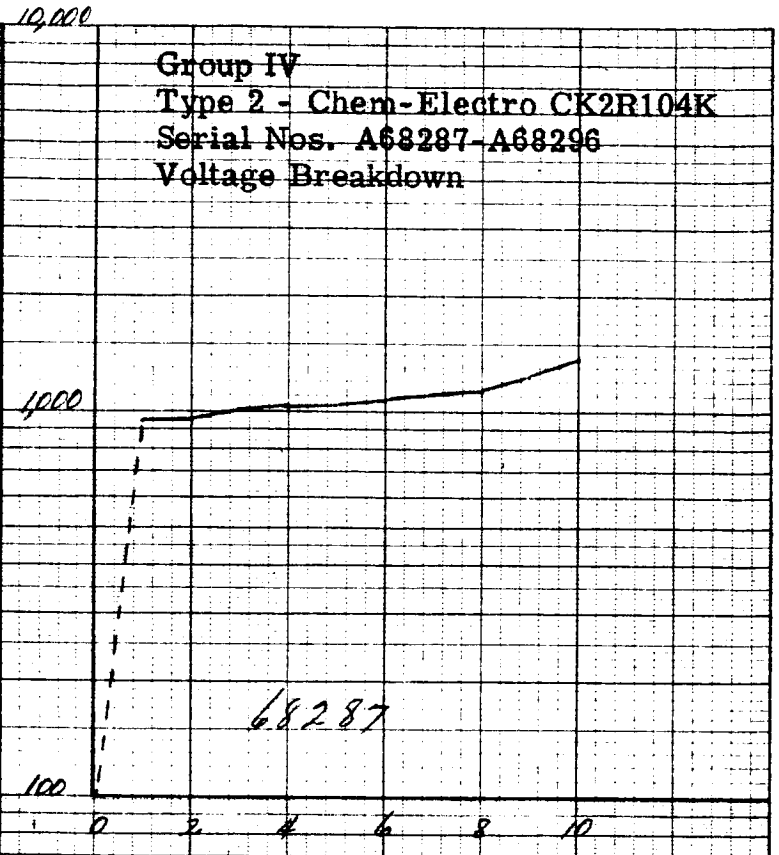


Figure IV-B

Group IV
Type 3 - Gulton CK16M104K
Serial Nos. A68462-A68471
Voltage Breakdown

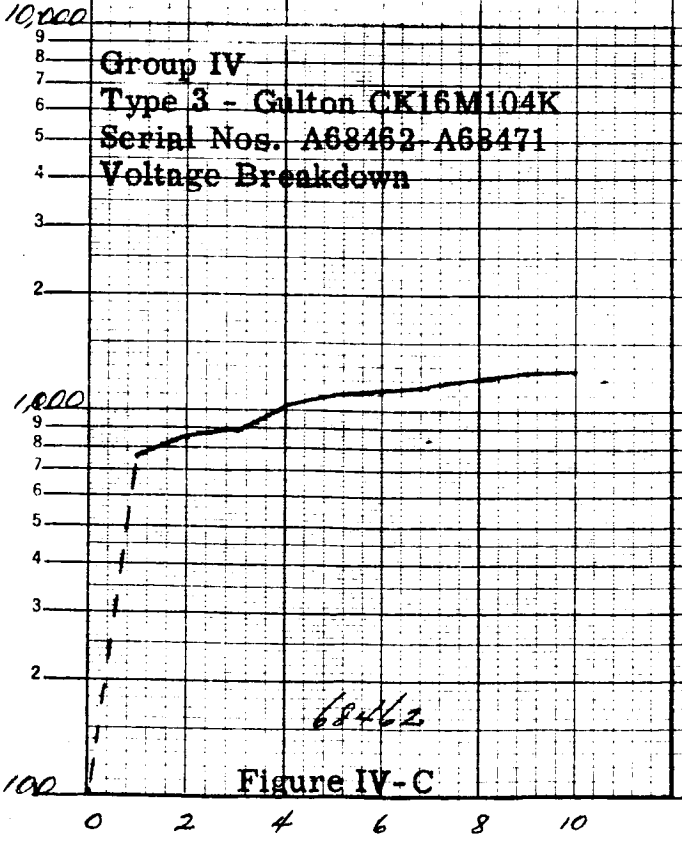


Figure IV-C

Group IV
Type 4 - Gulton CN05M105K
Serial Nos. A68637-A68646
Voltage Breakdown

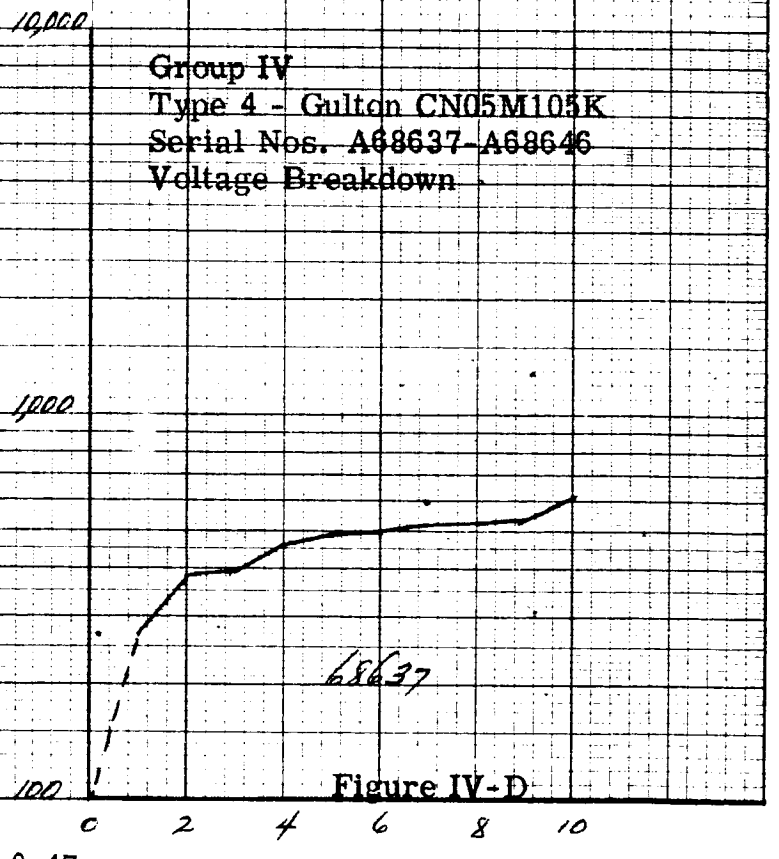


Figure IV-D

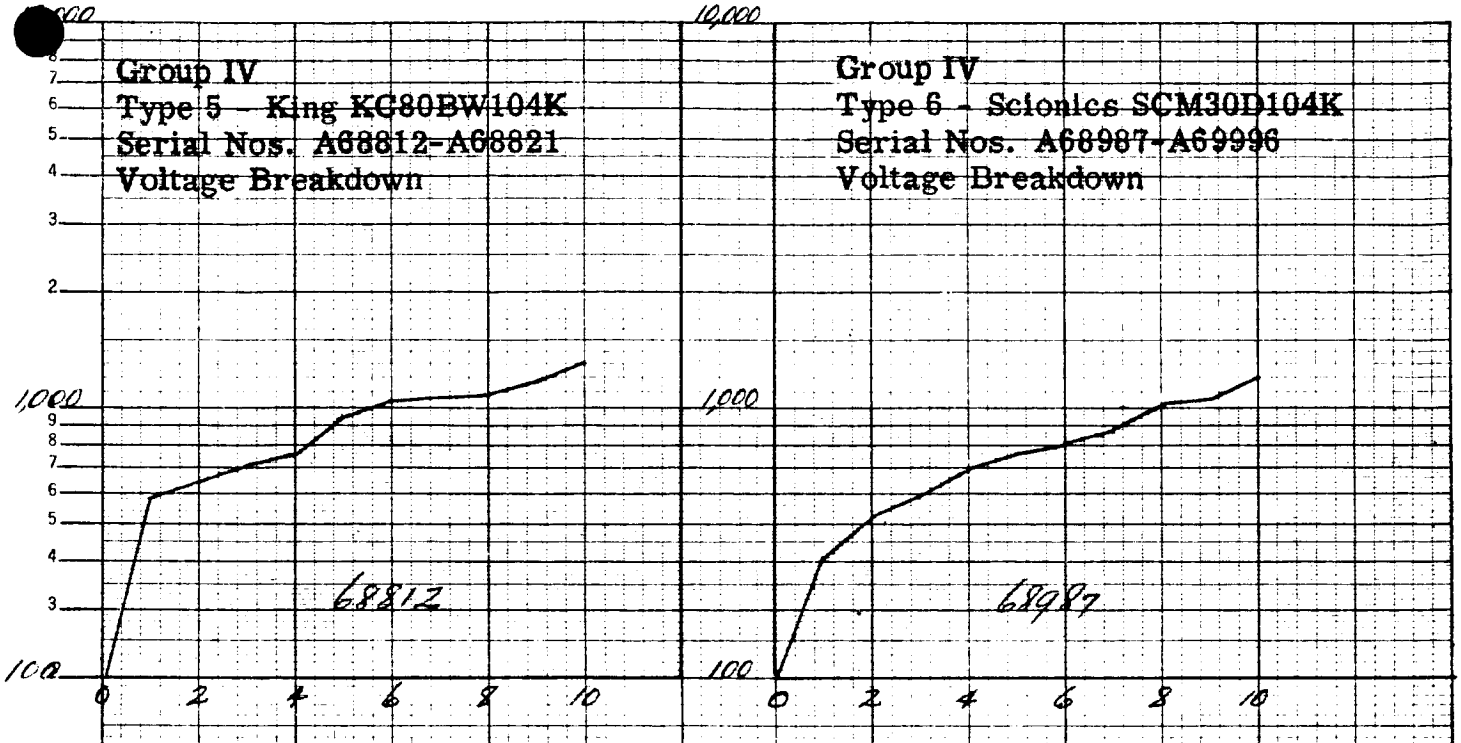


Figure IV-E

Figure IV-F

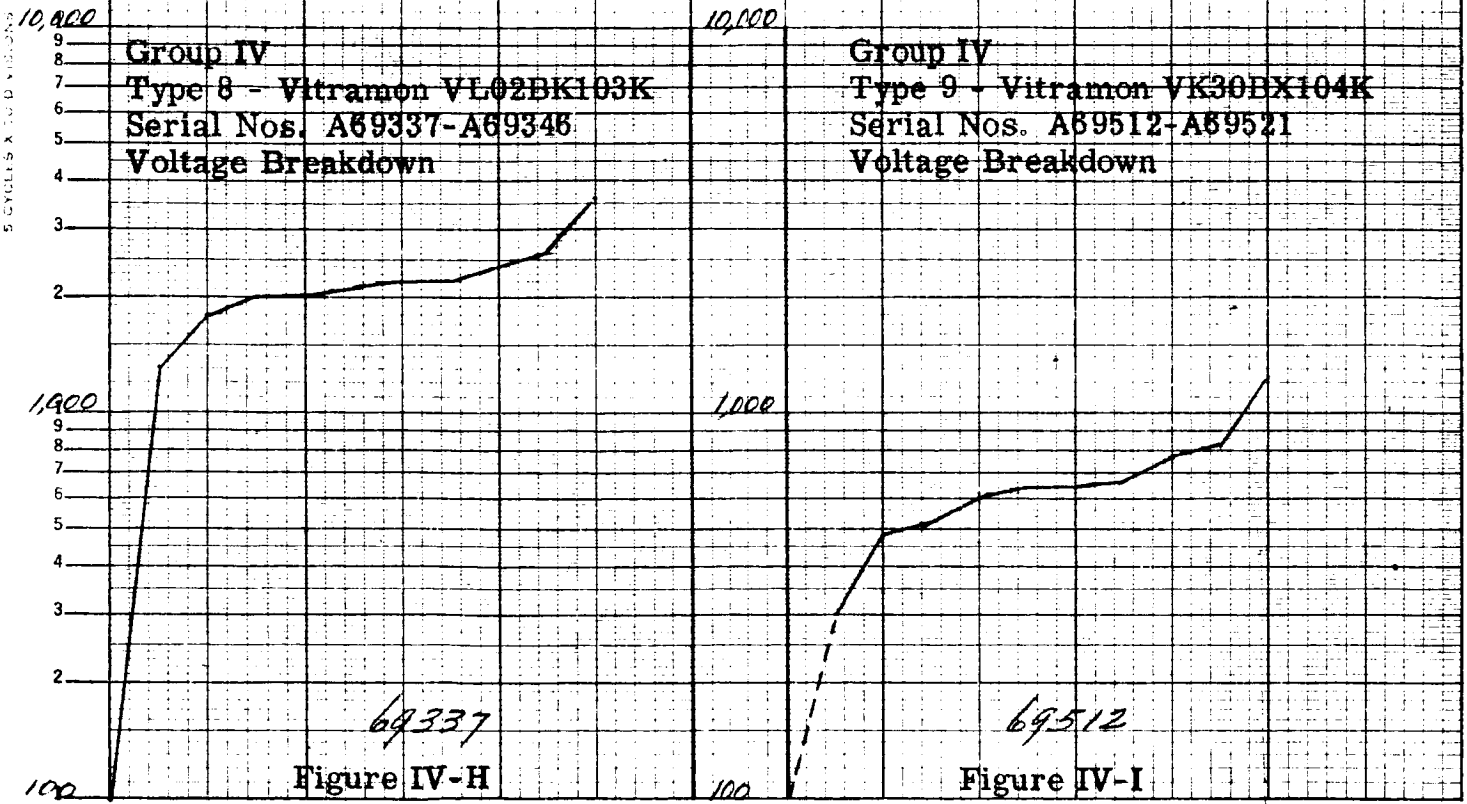


Figure IV-H

Figure IV-I

Group IV
Type 7 - Electro Materials EK200R104K
Serial Nox. A69162-A69171
Voltage Breakdown

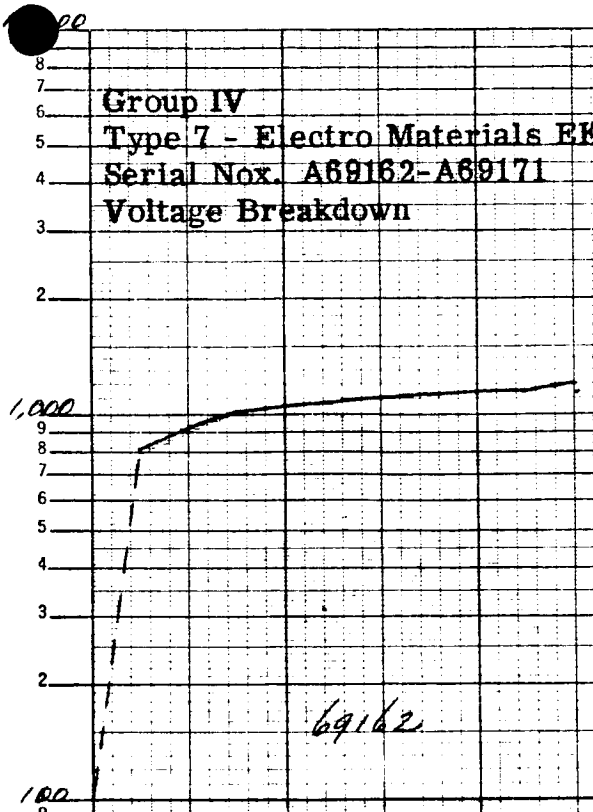


Figure IV-G

Group IV
Type 10 - Westcap B758BX104K
Serial Nos. A69687-A69696
Voltage Breakdown

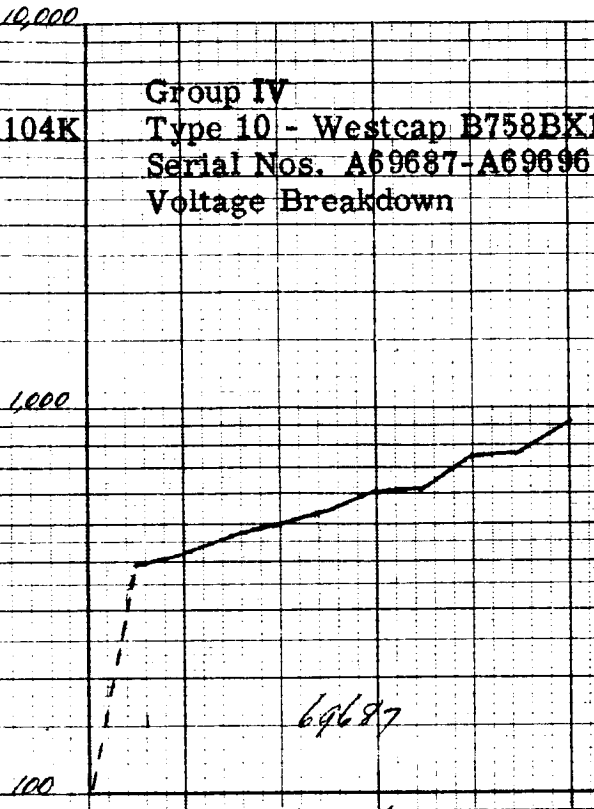


Figure IV-J

FAILURE ANALYSIS OF CATASTROPHIC FAILURES

Listed below are the results of failure analysis for catastrophic failures. Failure analysis was limited to 10% of any type on test (17 maximum). Details of the procedure and comments on construction are given in the results of the destructive voltage breakdown test.

Aerovox MC605104RK

No failures

CER CK2R104K

92-4-1	Leads separated from element. Element shows craze in lower center of one side indicating internal damage.
93-4-1	Lead separated from element - no other visible damage
84-5-1	" "
68347	" "
60-1-1	" "
50-6-1	" "
18-1-1	" "
12-1-1	" "
2-1-1	" "
144-1-1	One lead separated from element - no other visible damage
156-2-1	" "
131-1-1	" "
49-6-1	" "
95-4-1	" "
35-5-1	" "
8-1-1	" "
155-5-1	No apparent damage

Gulton CK16M104K

28-3-2	Integrity of unit maintained in depotting - no visible defects
38-2-2	" "
83-5-2	" "

158-2-2 Slight chipping at lead end of element possibly incurred in depotting

59-1-2 Internal defect observable on face of element indicative of damage

Gulton CN05M105K

Failure analysis on these parts was largely unsuccessful because of the extreme difficulty of dissolving the encapsulation. By the time the encapsulation is dissolved the element of the unit is damaged. Therefore, the following comments are not truly indicative of the true failure effects.

87-2-3 Some damage to surface layers of element. Probably caused in depotting.

97-6-3 " "

154-5-3 " "

28-3-3 " "

93-4-3 " "

98-6-3 " "

73-1-3 " "

89-2-3 " "

5-1-3 " "

168-6-3 " "

153-5-3 " "

169-6-3 " "

166-6-3 " "

151-5-3 " "

10-1-3 " "

81-5-3 Destroyed in depotting

100-6-3 "

King Eleetronics KC80BW104K

70-1-4 Visible cracks and separation of element surface.

47-6-4 " "

22-1-4 Crazing of surface on both sides of element. All of the above tend to indicate failure within the dielectric element.

Scionics SCM30D104K

Failure analysis on the Scionics parts was very unsuccessful because of the extreme difficulty in dissolving the encapsulation. By the time the encapsulation was dissolved the internal element was also delaminated and destroyed. Therefore, the following comments only indicate the damage sustained in depotting.

96-6-5	Complete destruction of unit
45-4-5	"
94-4-5	"
44-4-5	"
166-4-5	"
42-4-5	"
91-4-5	"
160-2-5	Partial destruction of unit - failure not visually observed
93-4-5	" "
161-4-5	" "
163-4-5	" "
162-4-5	" "
92-4-5	" "
164-4-5	" "
43-4-5	" "
158-2-5	" "
95-4-5	" "

EMC EK200R104K

2-1-6	Both leads separated from element - no apparent damage to element
46-6-6	" "
36-2-6	" "
66-1-6	" "
43-4-6	" "

70-1-6	One lead detached from element - no other visible damage
19-1-6	" "
50-6-6	" "
20-1-6	" "
88-2-6	" "
42-4-6	" "
45-4-6	" "
3-1-6	" "
69-1-6	No apparent damage
86-2-6	"
26-3-6	"
23-1-6	"

Vitramon VL02BK103K V-LAM

The outer shell, which appears to be molded epoxy was dissolved by Epoxystrip T-251-C Epoxy solvent. The active element appears to be covered by a dielectric gel type material under the outer shell. This material was removed by light mechanical stripping and the units examined.

Since many of the units failed "open" particular attention was given the contacts. The contact for these units is a thin metallic saddle to which the actual leads are welded. The comments listed below apply.

63-1-7	Complete or partial separation of contact from active element - no other apparent damage
81-5-7	" "
10-1-7	" "
29-3-7	" "
51-1-7	" "
71-1-7	No apparent damage
65-1-7	"
27-3-7	"
70-1-7	"
72-1-7	"

23-1-7	No apparent damage
78-3-7	"
69-1-7	"
60-1-7	"
4-1-7	"
38-2-7	"
92-4-7	"

Vitramon VK30 BX104K

28-3-8	Contact separation by failure of solder
151-5-8	"
147-3-8	Contact separation by cracking of element
158-2-8	No apparent damage
147-3-8	"
138-1-8	"
68-1-8	"
44-4-8	"
35-5-8	"
45-4-8	"
5-1-8	"
42-4-8	"
36-2-8	"
60-1-8	"
27-3-8	"

Westcap B758 BX104K

54-1-9	Delamination of element - probably due to depotting stresses
29-3-9	" "
22-1-9	Fracture & delamination of element probably due to depotting stresses
36-2-9	" "
13-1-9	" "
6-1-9	" "
126-1-9	" "
30-3-9	" "
167-6-9	No apparent damage

VISUAL AND MECHANICAL INSPECTION

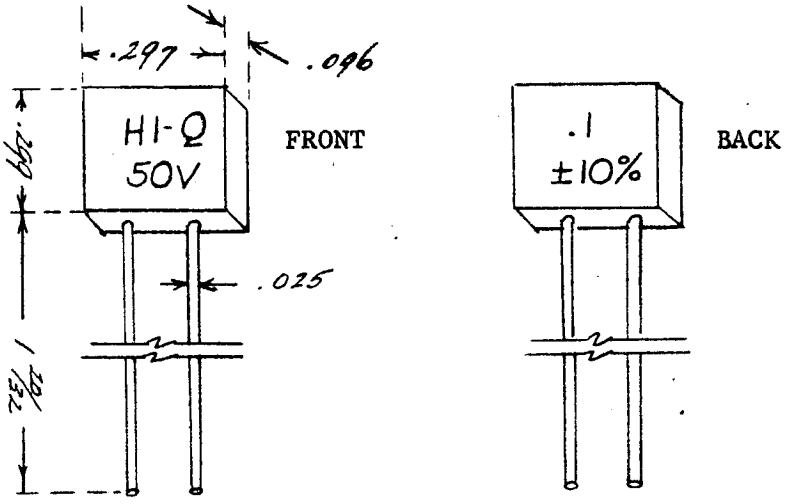
The results of the Visual and Mechanical Inspection are given in the laboratory log book.

Sketches of all parts together with complete identification data is given in the following pages.

CAPACITOR PHYSICAL DIMMENSIONS AND MARKS

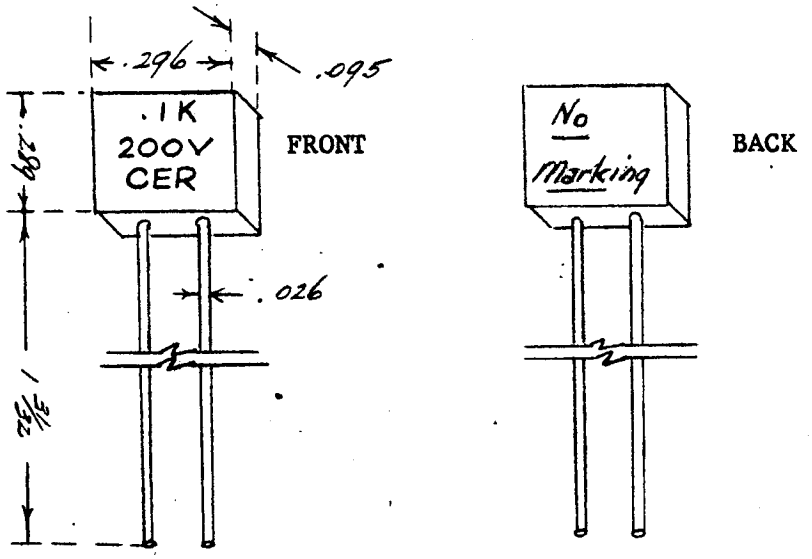
NO. 1

COMPONENT TYPE: AEROVOX MC605104RK — BLACK CASE
0.10 MFD., ± 10 PERCENT, 50 WVDC. — RADIAL LEADS



NO. 2

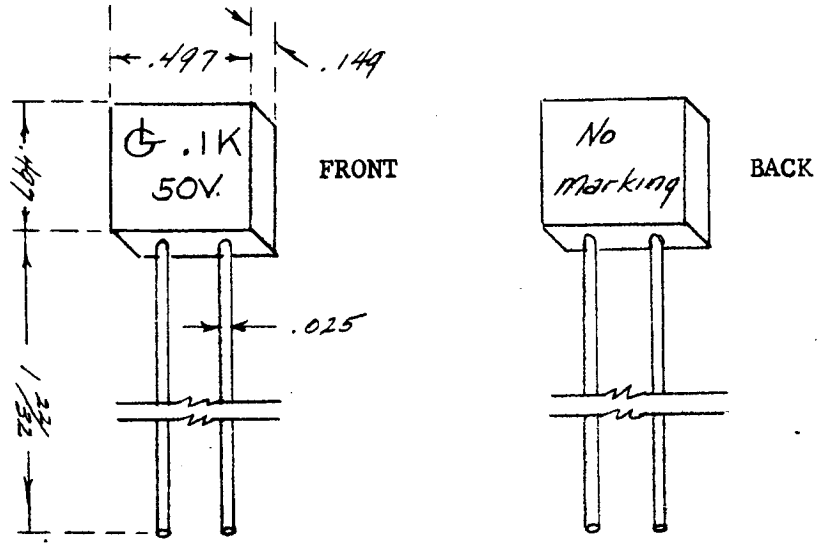
COMPONENT TYPE: CHEM-ELECTRO RESEARCH CK2R104K — BLACK CASE
0.10 MFD., 10 PERCENT, 200 WVDC. — RADIAL LEADS



NO. 3

COMPONENT TYPE: GULTON CK16M104 K
0.10 MFD., 10 PERCENT, 50 WVDC.

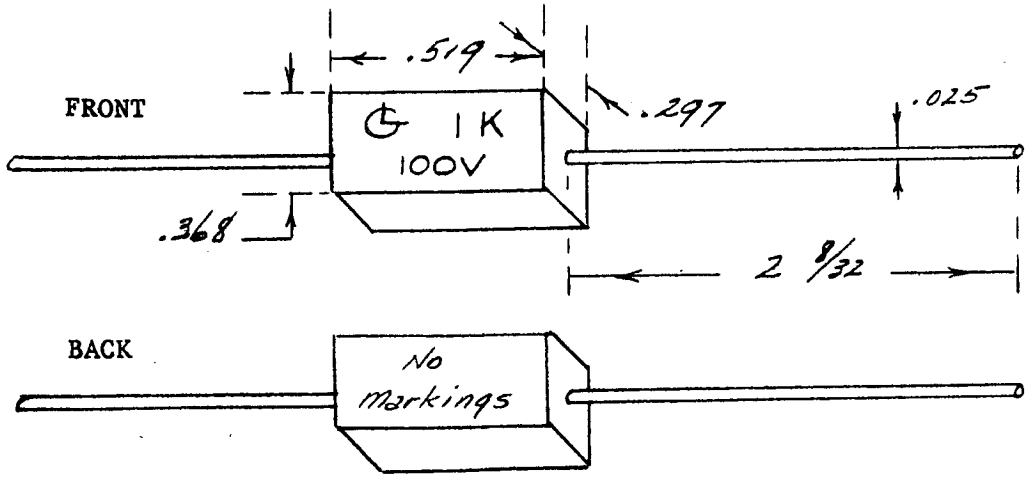
BLACK CASE
RADIAL LEADS



NO. 4

COMPONENT TYPE: GULTON CN05M105K
1.0 MFD., 10 PERCENT, 100 WVDC.

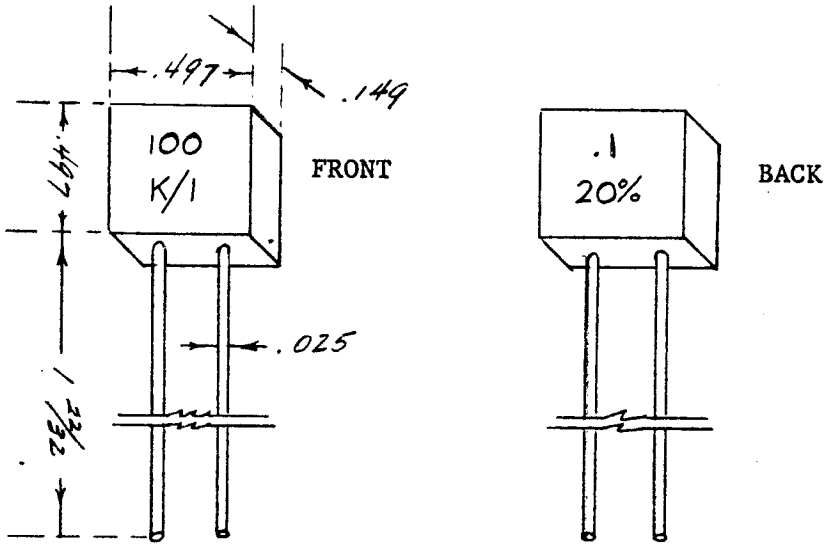
BLACK CASE
AXIAL LEADS



NO. 5

COMPONENT TYPE: KING ELECTRONICS, KC80BW104K
0.10 MFD., 20 PERCENT, 50 WVDC.

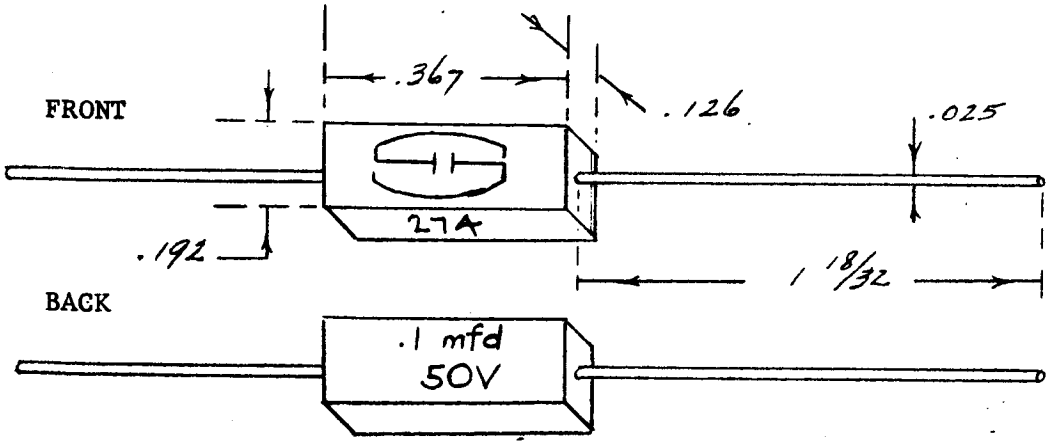
BLACK CASE
RADIAL LEADS



NO. 6

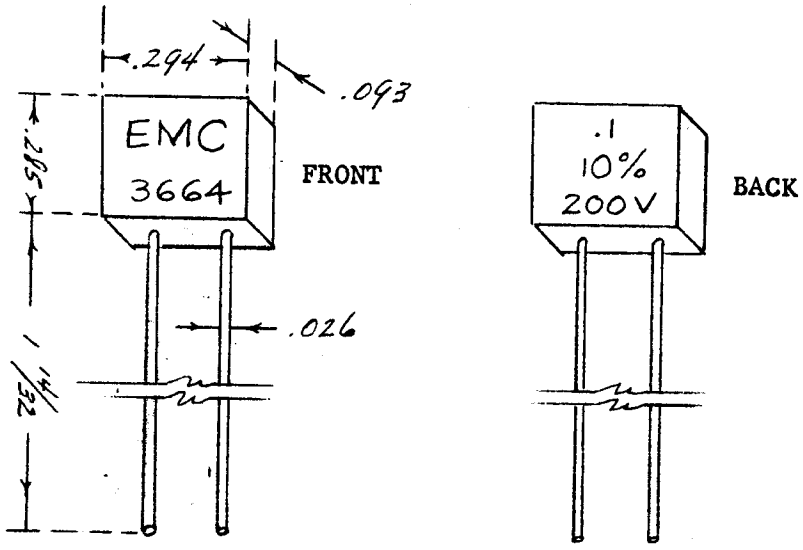
COMPONENT TYPE: SCIONICS SCM30D104K
0.10 MFD., 10 PERCENT, 50 WVDC.

BLACK CASE
AXIAL LEADS



NO. 7

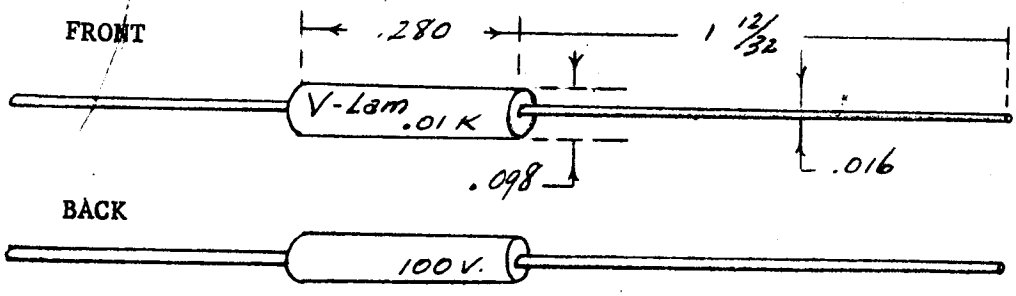
COMPONENT TYPE: ELECTRO MATERIALS CORP. EK200R104K BLACK CASE
0.10 MFD., 10 PERCENT, 200 WVDC. RADIAL LEADS



NO. 8

COMPONENT TYPE: VITRAMON VL02BK103K, V-LAM
0.01 MFD., 10 PERCENT, 100 WVDC.

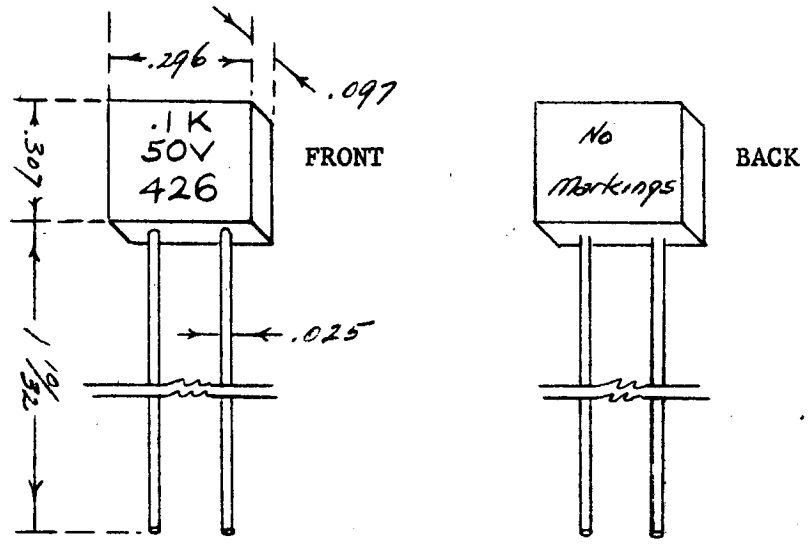
RED TUBULAR CASE
AXIAL LEADS



NO. 9

COMPONENT TYPE: VITRAMON VK30BX104K
0.10 MFD., 10 PERCENT, 50 WVDC.

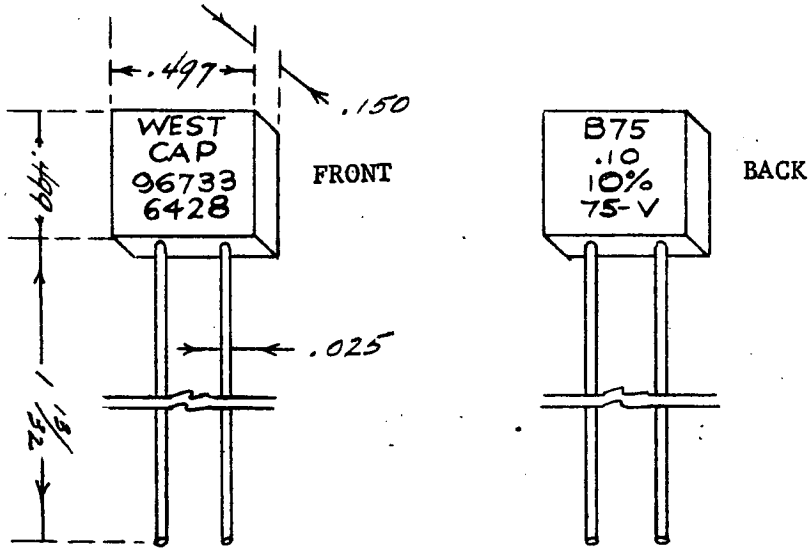
RED CASE
RADIAL LEADS



NO. 10

COMPONENT TYPE: WESTCAP B758BX104K
0.10 MFD., 10 PERCENT!, 75 WVDC.

WHITE CASE
RADIAL LEADS



X. DESCRIPTION OF PARAMETER CHANGES WITH ENVIRONMENTAL AND LIFE TESTS

Parametric behavior of the parts is best illustrated by the computed statistics sheets (Appendix III). These sheets are prepared in accordance with JPL Specification ZPP-2040-GEN-B. It should be noted that Nc on these sheets includes both catastrophic and parametric failures by the definitions in previous paragraphs. Specific comments relating to the various parts are listed below:

Aerovox MC605104RK

Group I and II - Burn-In and Environmental Sequence

Parameters through the burn-in testing were relatively stable. Capacitance and Insulation Resistance increased slightly while Dissipation Factor decreased slightly and the values tend to group more closely as evidenced by the tighter distribution at the end of the burn-in period.

All parts remained relatively stable throughout the first three environments although significant changes in the mean values are apparent by observation of the "t" values.

After the Moisture Resistance test 16 units were classed as parametric failures based upon low value of Insulation Resistance.

Groups I, II and V - Life Test, 85°C - 50 volts

The population of units in this matrix cell exhibited an increase (approximately 5%) in Capacitance through the life test, appearing to stabilize at the 1000 hour readout point. A definite increase in Dissipation Factor (approximately 25%) was also noted. Since these increases were not accompanied by large changes in variance ratios the entire population did in fact change. Negligible Insulation Resistance degradation was observed.

Life Test, 125°C - 50V

The parametric performance of this group was very similar to that described above.

Life Test, 85°C - 100 V

This test group did not experience the increase in capacitance noted in the above 50 volt test groups. The Dissipation Factor increase was present however, as well as a higher degree ot Insulation Resistance fluctuation.

Life Test, 125°C - 100V

This group behaved similarly to Groups 1 and 2 above with respect to Capacitance and Dissipation Factor. Insulation Resistance fluctuation is similar to all of the other groups.

Life Test, 85°C - 200V

After exhibiting a decrease in Capacitance to 1000 hours the mean Capacitance increased at the 2000 hour point. Like all other groups, Dissipation Factor increased throughout life. The value of Insulation Resistance, although higher than previous groups, showed about the same percent age variation in minimum value.

Life Test, 125°C - 200V

This condition, which represents the most extreme stress level produced a marked decrease in capacitance (10%) up to 100 hours followed by an increase to the original value at 2000 hours. The Dissipation Factor increased. Insulation Resistance showed about a 50% decrease during the Life Test.

CER CK2R104K

Groups I and II - Burn-In and Environmental Sequence

CER units exhibited a slightly tighter initial parametric grouping for Capacitance and Dissipation Factor than

Aerovox although the minimum Insulation Resistance was lower. The burn-in results indicate a significant change in the means.

Disregarding failures, the parametric behavior of these parts through the environmental sequence was quite stable on all parameters.

Groups I, II and V - Life Test

In general, these parts exhibited excellent stability and parametric grouping through the Life Tests. Capacitance was extremely stable, except for the highest stress levels, where typically a slight decrease was noted. Also, some increase, (generally less than 20%) in Dissipation Factor was observed. The minimum value of Insulation Resistance generally increased during life. However, it should be noted that this minimum value represents that obtained on surviving units rather than the entire population.

Gulton - CK16M104K

Groups I and II - Burn-In and Environmental Sequence

The behavior of the Gulton units is very similar to the CER units in that the change in parameters was small and the grouping was close through all of the environments up to Moisture Resistance. Here some degradation in Dissipation Factor and Insulation Resistance is apparent.

Groups I, II and V - Life Test

Behavior of the parts during the Life Test was also extremely stable. Degradation trends are not readily apparent at any stress level.

Gulton - CN05M105K

Groups I and II - Burn-In and Environmental Sequence

These units exhibit approximately the same percentage spread in Capacitance as described for the above listed

parts. However, the Dissipation Factor for these units is somewhat higher averaging above 1% which undoubtedly is representative of such a high capacitance - small size part. An increase in capacitance was noted during burn-in (approximately 3%). During the environmental sequence the mean Capacitance increased further (1.9%). The mean Dissipation Factor also increased approximately 15%. The Insulation Resistance data shows a wide fluctuation during the environments with particular degradation as evidenced by failures following the Moisture Resistance Test.

Groups I, II and V - Life Test

On the basis of the computed statistics the parametric behavior of these parts was as stable as any parts in the test. However, it should be noted that a high number of both parametric and catastrophic failures were encountered which do not contribute to the computed statistics, and that the stability observed is for surviving parts only.

King - KC80BW104K

Groups I and II - Burn-In and Environmental Sequence

These parts were as stable as any in the test throughout the environmental sequence. Some degradation, particularly in Dissipation Factor occurred as a result of the Moisture Resistance Test.

Groups I, II and V - Life Test

Parametric performance during the Life Test was very stable, particularly in view of the fact that a very small number of failures were encountered and thus, the drift of all parts was represented.

Scionics - SCM30D104K

Groups I and II - Burn-In and Environmental Sequence

Burn-in appears to tighten the parametric spread on

Dissipation Factor. This is possibly because of elimination of four marginal units. Also, the mean Dissipation Factor for these units is initially approximately three times as high as other like parts in the test, indicating that a different fabrication technique was used in manufacturing the parts.

Degradation on all parameters was observed during the environmental test. Moisture Resistance was particularly damaging with 25 failures being encountered on Dissipation Factor and 33 on Insulation Resistance. Degradation on surviving units was also apparent in the "mean" of Dissipation Factor measurements.

Groups I, II and V - Life Test

Because of the high number of failures and degradation encountered in the environments it was expected, and later developed, that the Life Test performance would be poor. It should be noted, however, that all of the failures in Life Testing cannot be attributed to the effects of prior environments. Of 56 complete catastrophic failures in life, 15 were Group V parts, which had not been subjected to prior environments.

EMC - EK200R104K

Groups I and II - Burn-In and Environmental Sequence

The EMC parts developed, on a comparative basis, a high degree of failures both in Burn-In and through the environments, however parametric behavior of surviving units was relatively stable except at Moisture Resistance where some spreading of Dissipation Factor was noted.

Groups I, II and V - Life Test

Parametric behavior of these parts was stable during life for surviving parts. Although effects of prior

environments are suspect, all complete catastrophic failures cannot be attributed to them since five of the 15 complete failures during Life were from Group V parts.

Vitramon VL02BK103K V-LAM

Group I - Burn-In and Environmental Sequence

These units show a significant parametric shift at Burn-In for both Capacitance and Dissipation Factor.

In the environments a number of failures (16) were encountered as a result of Vibration. Moisture Resistance also produced 11 additional failures as well as producing definite degradation effects upon Dissipation Factor.

Groups I, II and V - Life Test

Although a number of failures were encountered during life, the parametric behavior of surviving units was stable without degradation trends being apparent. While it might be suspected that prior environments caused Life Test problems nine of 17 complete catastrophic failures were Group V parts which had not been exposed to prior environments.

Vitramon VK30BX104K

Groups I and II - Burn-In and Environmental Sequence

Performance of these parts was stable through the test series although some degradation in Dissipation Factor can be attributed to the Moisture Resistance Test.

Groups I, II and V - Life Test

The Life Test performance of these units, while better than average, appears to be different than most of the other parts in the test as almost all of the failures were truly catastrophic rather than parametric and appear to occur almost randomly. Of interest is the fact that no

failures occurred in the highest stressed cell of the Life Test Matrix.

Westcap - B758BX104K

Groups I and II - Burn-In and Environmental Sequence

Initially the mean value of capacitance for these units was 89.3 nanofarads rather than the 100 nanofarads inplicit in the specification of 100 nf $\pm$10%. Whether this low value was because of the manufacturer's selection technique or a basic instability in the devices is open to question, particularly in view of subsequent performance.

After Burn-In 42 of 50 units dropped below the lower limit. No failures were noted, however. As the units passed through the environments no marked changes were noted until the Post Thermal Shock measurement where 13 of the parts failed on Dissipation Factor. The effects of Moisture Resistance were even more severe with 59 parts failing the Capacitance Test and 91 failing on Dissipation Factor. Review of the data for individual parts indicates little if any correlation to prior readings. Also of interest is the fact that only 25 parts failed the Insulation Resistance Test.

Groups I, II and V - Life Test

In view of the instability of the components during environmental testing, it would be expected that Life Testing would produce an extremely large number of failures. Actually, a very small number of additional failures (6 catastrophic) were produced during the Life Test. Although the statistical treatment does not include parametric failures, these parametric failures remained on test for the entire life test period and thus could be expected to perform in a normal circuit application.

SUMMARY

Extreme differences in the parametric behavior of the various types of units through the test series was not observed. The Moisture Resistance test appeared to have more effect than any other exposure and degradation of all units occurred in one degree or another. It is also apparent that the effects of Moisture Resistance are less severe on the parts where monolithic internal construction is used.

The effects of life testing are best judged on the basis of actual failures rather than parametric shifts, since, as will be shown subsequently, parameter shift and the results of life test performance do not correlate well for this test.

XI. RELIABILITY ESTIMATES AND COMPARISONS

In the computed statistics sheets the number of catastrophic failures (Nc) includes both complete catastrophic failures (open or short) and parametric failures as previously defined. While such a definition is comparative in the sense that all units are subjected to the same criteria of failure, this definition does not completely define a failed part. Instead, in the context of this test, it defines a failed parameter.

Furthermore, the removal of parametric failures prior to computation of statistics leads to "filtered" data when appreciable numbers of failures occur. Therefore, comparisons on the basis of parametric behavior are extremely difficult to develop, although parametric behavior does illustrate possible weaknesses in the parts.

Since parts were tested to the completion of the test or destruction, whichever happened first, (i.e., parametric failures were not removed from the tests), and since examination of data on the parts shows in many cases that the parameters of the part stabilize after becoming a parametric failure, it would appear logical to offer reliability comparisons on the basis of catastrophic failures alone. This approach is further justified by the fact that in five of the six Life Test Matrix cells the maximum sample size is 15 parts which can at best (0 failures) define a failure rate of 0.78%/1000 hours at a confidence level of 90%.

Figure 4 has been prepared on the basis of complete catastrophic failures, i.e., parts removed from the test for all causes except leads broken in handling. In this chart parts are ranked by number of Life Test Failures as well as number of Total Failures. The correlation between Life Failures and Total Failures can be considered to be perfect. Life and Environment do not correlate as well except for the extremes in ranking.

Figure 5 presents calculated failure rate at 90%, 60% and 50% confidence levels for all matrix cells together with a combined

EXPONENTIAL FAILURE RATES
LIFE TEST

Volts	Confidence Level	85°	125°	85°	125°	85°	125°	85°	125°	85°	125°
		Aerovox MC605104		CER CK2R104		Gulton CK16M104		Gulton CN05M105		King KC80BW104	
	90%	1.55%	7.8%	12.5%	25.0%	1.55%	15.0%	10.0%	28.0%	1.60%	7.8%
50	60	0.60	3.1	9.6	15.5	0.60	8.0	8.0	17.5	0.64	3.1
	50	0.46	2.3	8.6	13.5	0.46	6.2	7.2	16.0	0.48	2.3
	90	7.8	7.8	29.5	22.0	8.2	7.8	9.2	29.5	7.80	7.8
100	60	3.1	3.1	18.0	11.0	3.3	3.1	3.6	18.0	3.1	3.1
	50	2.3	2.3	16.0	13.0	2.5	2.3	2.8	16.0	2.3	2.3
	90	7.8	7.8	37.0	9.0	7.8	7.8	63.0	68.0	7.8	14.0
200	60	3.1	3.1	24.0	3.5	3.1	3.1	49.0	55.0	3.1	7.2
	50	2.3	2.3	21.2	2.7	2.3	2.3	45.0	50.0	2.3	6.0
Combined											
	90	0.78		12.2		1.82		15.0		1.30	
	60	0.32		10.3		1.06		12.6		0.64	
	50	0.24		9.8		0.91		12.1		0.58	
		Scionics SCM30D104		EMC EK200R104		Vitramon VL02BK		Vitramon VK30BX		Westcap B758BX104	
	90%	22%	94%	8.5%	23.5%	15.0%	15.4%	5.6%	19.2%	4.7%	8.2%
50	60	17	69	6.0	13.6	11.6	8.0	3.7	11.3	3.0	3.3
	50	15.5	65	5.4	12.0	11.0	6.6	3.3	9.8	2.6	2.5
	90	94	206	20.0	9.6	17.2	14.5	26.0	27.5	8.5	8.2
100	60	69	160	12.0	3.8	8.8	7.6	16.5	17.0	3.6	3.3
	50	65	145	10.2	3.0	7.4	6.2	14.5	15.2	2.7	2.5
	90	207	20	19.0	23.0	8.2	19.0	19.5	7.8	7.8	7.8
200	60	161	12	11.2	13.1	3.3	10.0	11.5	3.1	3.1	3.1
	50	146	10.2	9.8	11.5	2.5	8.2	10.0	2.3	2.3	2.3
Combined											
	90	41.0		8.8		9.3		7.3		2.8	
	60	36.0		6.4		7.5		5.7		1.85	
	50	35.0		5.9		7.0		5.3		1.65	

Figure 5

figure for each part. The ranking of the data gives the same results as Figure 4.

It is obvious from the above data that the Aerovox parts demonstrated superior performance in this test. The test does not show, however, what failure rate might ultimately be achieved by Aerovox since no failures were encountered and the failure rate demonstrated is merely statistical based upon unit hours without failure.

In addition to the foregoing data, which gives the reliability results actually achieved in the test, one of the goals of this program was to determine the effects of the Screen Burn-In upon reliability, particularly as to whether application of a Screen Test might result in substantially lower failure rates both by "weed out" and prediction.

GroupI parts only were subjected to a Screen Burn-In per JPL ZPP-2073-0101D, therefore, one approach to the effectiveness of screening would be to calculate failure rates for Groups I, II and V separately with Group I screening failures removed. Such a procedure poses a problem, however, because the resultant sample sizes are too small for significant results to be achieved. Since the basic Group I sample size is small (50 parts) another approach which can be applied is to individually determine the fate of screening failures through the course of the test, and determine if, in fact, the screening test was effective in failure prediction.

Since JPL ZPP-2073-0101D is designed both as an acceptance document and a screening document, and is written for a specific capacitor type (Aerovox HMC 80) only the parts of the specification concerning percentage change were employed as screening criteria. These are contained in paragraph f, (2) - the capacitance change shall be less than $\pm 5\%$, and in paragraph f, (3) - the change in dissipation factor shall be less than 30%.

Using these end points as definitions, Figure 6 was developed.

SCREENING SUMMARY

	Total Failures to Screening Spec	Failures Removed From Test	Screening Failures Into Test	Subsequent Failures of Screening Failures	Total Failures From Parts Screened
Aerovox MC605104RK	13	0	13	0	0
CER CK2R104K	4	2	2	1	23
Gulton CK16M104K	2	0	2	0	1
Gulton CN05M105K	3	2	1	1	12
King KC80BW104K	2	1	1	1	1
Scionics SCM30D104K	5	2	3	1	32
EMC EK200R104K	11	9	2	2	8
Vitramon VL02BK103K V-LAM	16	0	16	4	9
Vitramon VK30BX104K	3	0	3	1	8
Westcap B758BX104K	5	0	5	0	6
Total all mfgs.	64	16	48	11	100
Total Top 5 mfgs. #1, 3, 5, 9, 10	25	1	24	2	16
Total Low 5 mfgs.	39	14	25	9	84

Figure 6

Figure 6 is a listing of manufacturers together with various specified failures. The first failure column represents the number of screening failures at the end of the screening test. Column 2 presents the failures removed from the test at or before this data point for being complete catastrophic failures. Column 3 is the difference between columns 1 and 2 and represents the number of screening failures which were subjected to the remainder of the tests. Column 4 presents screening failures that did, in fact, become catastrophic failures. Column 5 presents the total number of catastrophic failures from previously screened Group I parts which had to be removed from the test.

Figure 6 shows that the screening prediction was true only for the King parts wherein one failure was predicted and this part did, in fact, fail. The results are somewhat spotty for the other parts in the test. The data does indicate, however, that the screening test predicts, as indicated by the totals, approximately the same number of failures regardless of subsequent part performance, or, as discussed in the foregoing paragraphs, a similar degree of parametric stability for parts offering different degrees of reliability.

This screening test therefore tends to predict a higher failure rate than actually observed for high reliability parts and lower than actually observed for low reliability parts. This fact alone is not too important if the screening test does, in fact, eliminate a high percentage of potential failures. Actually, in this respect, the screening is not too effective. For example in the case of the highest rated parts only two of 16 failures (12.1%) were removed and for the lower ranked parts nine of 84 (10.7%) were removed. The overall figure is 11 from a total of 100 (9.1%),. If this true failure rate were known in advance ($\approx$20%), a random selection could provide better results.

Obviously, these screening criteria are not definitive for ceramic capacitors which inherently exhibit a high degree of parametric instability compared to most passive electrical components. It appears that in

the relationship between changes in parameter and reliability, Insulation Resistance changes might offer the most sensitivity followed by Dissipation Factor and Capactiance, respectively. Current techniques for measuring these parameters, such as the Insulation Resistance procedure used in this test, do not offer sufficient definition to offer a solution.

XII. CONCLUSIONS

This test shows without doubt that there is a wide variation in the reliability of ceramic capacitors offered by various manufacturers. Moreover, it shows that differences in reliability exist for a given manufacturer depending upon the specific fabrication techniques used.

In a general sense, capacitors fabricated from "monolithic" block elements show a higher degree of reliability and stability than "stacked" units. This is particularly true where resistance to moisture is concerned.

The test also illustrates that mechanical fabrication techniques can affect reliability to a marked degree, particularly where weak electrical contacts are involved as was the case with two of the manufacturers.

Results of this test also illustrate that no correlation exists between manufacturer's rated voltage and reliability. Parts bearing a higher voltage rating did not perform as well as lower voltage parts. In fact, the parts exhibiting the best performance were rated at only fifty volts.

The test does not appear to offer a solution to the question of effectiveness of a "screen" test or "burn-in" and its effect on reliability prediction. In this regard, however, it is not known to what extent parts were subjected to pre-treatment before being shipped from the respective manufacturers.

While this test shows the relative differences in manufacturers in an absolute sense, insufficient data was generated to provide quantitative reliability data for the higher ranking manufacturers. In the case of the Aerovox components, where no real failures developed, it would appear that a test of approximately 10 times this size under more severe stress conditions might be necessary to produce the desired results.

APPENDIX I
CATASTROPHIC FAILURES

Item No.	Date	Remarks
42-4-0	8-13-65	Lead broken in handling
16-1-1	3-22-65	Intermittent short - post moisture resistance
28-3-1	2-24-65	" " " vibration
34-5-1	2-24-65	" " " "
17-6-1	3-4-65	Shorted during mechanical shock
12-1-1	2-15-65	Shorted - post burn-in measurement
35-5-1	2-18-65	" during burn-in
49-6-1	2-15-65	Shorted - post burn-in
18-1-1	2-24-65	" Post vibration
51-1-1	2-17-65	" "
77-3-1	2-17-65	" "
92-4-1	2-17-65	" "
95-4-1	2-17-65	" "
50-6-1	4-7-65	Intermittent Short - 168 hr. life
2-1-1	5-19-65	Open - 500 hr. life
60-1-1	5-19-65	" "
53-1-1	6-22-65	Open - 1000 hr. life
144-1-1	6-22-65	" "
26-3-1	6-23-65	" "
29-3-1	6-24-65	" "
84-5-1	6-24-65	" "
155-5-1	6-24-65	" "
42-4-1	6-28-65	" "
39-2-1	6-28-65	" "
156-2-1	6-28-65	Int. Short "
83-5-1	6-24-65	Open "
68347	3-1-65	Short - Post Shock
131-1-1	8-9-65	Open - 2000 hr. life
73-1-1	8-9-65	" "
70-1-1	8-9-65	" "
8-1-1	8-9-65	" "
11-1-1	8-9-65	" "
20-1-1	8-9-65	" "
13-1-1	8-9-65	" "
93-4-1	8-13-65	" "
38-2-1	8-13-65	" "
32-5-1	8-13-65	" "
27-3-1	8-13-65	" "
28-3-2	3-4-65	Short - Post shock
38-2-2	3-4-65	Short - Initial Measurement
59-6-2	2-17-65	Short - Post vibration

Item No.	Date	Remarks
158-2-2	5-25-65	Short - 500 hr. life
160-2-2	8-12-65	Lead broken in handling (2000 hr. readout)
83-5-3	8-14-65	Short - 2000 hr. life
5-1-3	4-5-65	Short - Life Test 96 hrs.
10-1-3	2-15-65	Short - Burn-in
73-1-3	4-1-65	Short - Life test 8 hrs.
81-5-3	6-2-65	Short - 1000 hr. life
87-2-3	5-5-65	" 500 hr. life
89-2-3	4-9-65	" life test 120 hrs.
93-4-3	4-9-65	" life test 120 hrs.
98-6-3	4-29-65	" 168 hr. life
100-6-3	4-7-65	" Life test - 48 hrs.
151-5-3	4-5-65	" life test - 120 hrs.
153-5-3	5-6-65	" 500 hr. life
154-5-3	4-6-65	" 168 hr. life
166-6-3	6-8-65	" 1000 hr life
168-6-3	4-6-65	" 168 hr. life
169-6-3	4-6-65	" "
97-6-3	6-7-65	" 1000 hr. life
28-3-3	2-15-65	" Burn-in
22-1-3	3-12-65	" thermal shock
31-5-3	5-27-65	" 500 hr. life
39-2-3	2-15-65	" 168 hr. life
40-2-3	6-11-65	" 1000 hr. life
41-2-3	2-18-65	Lead broken in vibration
47-6-3	4-29-65	Cracked case - 168 hr. life
42-4-3	2-18-65	Lead broken in vibration
74-1-3	4-1-65	Short - Moisture resistance
133-1-3	1-28-65	Intermittent short - initial measurement
146-3-3	1-26-65	Short - Initial readout
131-1-3	6-22-65	IR short - 1000 hr. life
129-1-3	6-22-65	" "
134-1-3	6-22-65	" "
95-4-3	6-25-65	Lead broken in handling 1000 hr. life
20-1-3	7-6-65	Intermittent short - 2000 hr. life
142-1-3	4-6-65	Short - 168 hr. life
136-1-3	8-9-65	IR short - 2000 hr life
155-5-3	8-14-65	Short - 2000 hr. life
45-4-3	8-16-65	" "
43-4-3	8-16-65	" "
49-6-3	8-16-65	" "
70-1-4	2-15-65	Short - Burn-in
22-1-4	3-22-65	Short - Moisture Resistance
47-6-4	4-29-65	Open - 168 hr. life

Item No.	Date	Remarks
13-1-5	2-16-65	Short - Burn-in
25-1-5	2-16-65	" "
2-1-5	2-18-65	Lead broken in vibration
5-1-5	2-18-65	"
11-1-5	2-18-65	".
15-1-5	2-24-65	Short - Post vibration
63-1-6	3-2-65	Short - Post Mechanical Shock
27-3-5	2-24-65	Short - Post Vibration
6-1-5	3-22-65	Short - Post Moisture Resistance
14-1-5	3-22-65	" "
53-1-5	3-26-65	" "
55-1-5	3-26-65	" "
56-1-5	3-26-65	" "
57-1-5	3-26-65	" "
59-1-5	3-26-65	" "
60-1-5	3-26-65	" "
64-1-5	3-26-65	" "
67-1-5	3-26-65	" "
68-1-5	3-26-65	" "
71-1-5	3-26-65	" "
72-1-5	3-26-65	" "
73-1-5	3-26-65	" "
75-1-5	3-26-65	" "
42-4-5	3-24-65	" "
41-4-5	3-24-65	" "
38-2-5	3-24-65	" "
22-1-5	3-24-65	" "
12-1-5	3-24-65	" "
9-1-5	3-24-65	" "
10-1-5	4-1-65	Short - 168 hr. life
24-1-5	4-2-65	" "
66-1-5	4-2-65	" "
70-1-5	4-2-65	" "
74-1-5	4-2-65	" "
154-5-5	4-5-65	" "
35-5-5	4-5-65	" "
32-5-5	4-6-65	" "
31-5-5	4-6-65	" "
7-1-5	4-7-65	" "
92-4-5	4-9-65	" "
95-4-5	4-12-65	" "
162-4-5	4-12-65	" "
94-4-5	4-29-65	" "
96-6-5	4-29-65	" "
151-5-5	4-28-65	" "

Item No.	Date	Remarks
33-5-5	5-3-65	Short - 500 hr. life
95-4-5	5-3-65	" "
121-1-5	5-3-65	" "
156-2-5	5-5-65	" "
163-4-5	5-6-65	" "
158-2-5	5-9-65	" "
44-4-5	5-9-65	" "
160-2-5	5-12-65	" "
161-4-5	5-12-65	" "
164-4-5	5-12-65	" "
81-5-5	6-2-65	Short - 1000 hr. life
85-5-5	6-3-65	" "
93-4-5	6-7-65	" "
34-5-5	6-7-65	" "
91-4-5	6-7-65	" "
43-4-5	6-7-65	" "
165-4-5	6-14-65	" "
157-2-5	6-17-65	" "
26-3-5	4-2-65	Short - 168 hr. life
30-3-5	4-2-65	" "
77-3-5	4-2-65	" "
54-1-5	6-23-65	Short - 1000 hr. life
62-1-5	6-23-65	" "
21-1-5	6-23-65	" "
23-1-5	6-23-65	" "
86-2-5	7-7-65	Short - 2000 hr. life
29-3-5	7-8-65	" "
82-5-5	7-8-65	" "
90-2-5	7-9-65	" "
125-1-5	7-12-65	" "
84-5-5	4-6-65	Short - 168 hr. life
36-2-5	2-18-54	Lead broken in vibration
53-5-5	7-27-65	Short - 2000 hr. life
83-5-5	7-27-65	" "
149-3-5	7-28-65	" "
39-2-5	7-29-65	" "
37-2-5	7-30-65	" "
87-2-5	7-30-65	" "
78-3-5	8-6-65	" "
146-3-5	8-14-65	" "
40-2-5	8-16-65	" "
2-1-6	2-16-65	Intermittent short - Post burn-in
19-1-6	2-16-65	" "
23-1-6	2-8-65	Short - Burn-in
42-4-6	2-16-65	" "
26-3-6	2-24-65	" "

Item No.	Date	Remarks
36-2-6	2-24-65	Short - Burn-in
45-4-6	2-24-65	" "
46-6-6	2-24-65	" "
50-6-6	2-24-65	" "
69-1-6	2-17-65	Open - Post vibration
70-1-6	2-17-65	Short "
86-2-6	2-17-65	" "
88-2-6	2-17-65	Short - Post Mechanical Shock
20-1-6	3-4-65	" "
96-6-6	3-2-65	" "
66-1-6	3-12-65	" "
3-1-6	3-11-65	Short - Post Thermal Shock
43-4-6	3-11-65	" "
165-4-6	6-2-65	Lead broken in handling 1000 hr. life
7-1-6	6-23-65	Open - 1000 hr. life
1-1-6	6-23-65	" "
142-1-6	6-23-65	" "
75-1-6	6-23-65	" "
68-1-6	6-23-65	" "
59-1-6	6-23-65	" "
129-1-6	6-23-65	" "
153-5-6	6-24-65	" "
34-5-6	6-24-65	" "
149-3-6	6-24-65	" "
40-2-6	6-28-65	" "
97-6-6	6-28-65	" "
167-6-6	6-28-65	" "
37-2-6	8-16-65	Short - 2000 hr. life
4-1-7	2-8-65	Case fractured in vibration
27-3-7	2-24-65	Short - Post vibration
38-2-7	2-24-65	" "
48-6-7	2-18-65	Lead broken in vibration
49-6-7	2-18-65	" "
50-6-7	2-18-65	" "
56-1-7	2-12-65	" "
59-1-7	2-12-65	" "
60-1-7	3-8-65	Short - Post Thermal Shock
69-1-7	3-8-65	" "
70-1-7	3-8-65	" "
78-3-7	3-865	" "
81-5-7	3-8-65	" "
92-4-7	3-8-65	" "
100-6-7	3-8-65	" "

Item No.	Date	Remarks
23-1-7	6-23-65	Open - 1000 hr. life
123-1-7	6-23-65	" "
72-1-7	6-23-65	" "
131-1-7	6-23-65	" "
63-1-7	6-23-65	" "
128-1-7	6-23-65	" "
134-1-7	6-23-65	" "
127-1-7	6-23-65	" "
126-1-7	6-23-65	" "
65-1-7	6-23-65	" "
71-1-7	6-23-65	" "
148-3-7	6-24-65	" "
160-2-7	6-28-65	" "
164-4-7	6-28-65	" "
165-4-7	6-28-65	" "
40-2-7	6-29-65	Broken lead - 1000 hr. life
29-3-7	3-4-65	Short - Post Mechanical Shock
69398	3-12-65	Unstable - Thermal Shock
135-1-7	8-12-65	Open - 2000 hr. life
151-1-7	8-12-65	" "
27-3-8	4-2-65	Short - 168 hr. life
60-1-8	4-6-65	" "
68-1-8	4-6-65	" "
28-3-8	4-8-65	" "
44-4-8	4-9-65	" "
36-2-8	4-9-65	" "
5-1-8	2-24-65	" Post Vibration
45-4-8	4-5-65	" 168 hr. life
42-4-8	5-28-65	" 500 hr. life
35-5-8	6-16-65	" 1000 hr. life
57-1-8	8-12-65	" 2000 hr. life
138-1-8	8-12-65	" "
151-5-8	5-24-65	" 500 hr. life
147-3-8	8-14-65	" 2000 hr. life
158-2-8	8-16-65	" "
51-1-9	2-12-65	Leads broken in vibration
92-4-9	2-12-65	" "
6-1-9	3-4-65	Short - Post Mechanical Shock
13-1-9	3-22-65	Short - Post Moisture Resistance
29-3-9	3-22-65	" "
30-3-9	3-22-65	" "
36-2-9	3-22-65	" "
167-6-9	4-7-65	Short - 168 hr. life
126-1-9	4-28-65	" "
54-1-9	7-6-65	Short - 2000 hr. life
22-1-9	8-12-65	" "

APPENDIX II
PARAMETRIC FAILURES

Item No.	Prior Meas.	Exp.	Post P. F. Meas.	Exp.	Group No.		Mfg.
46	806	4	988	4	6	0	24
47	928	4	1095	4	6	0	23
47			1081	4	6	0	24
156	1020	4	1178	4	2	0	21
156			1168	4	2	0	22
156			1195	4	2	0	23
156			1234	4	2	0	24
166	976	4	1133	4	6	0	21
166			1127	4	6	0	22
166			1166	4	6	0	23
166			1144	4	6	0	24
167	991	4	1177	4	6	0	21
167			1169	4	6	0	22
167			1191	4	6	0	23
167			1179	4	6	0	24
2	956	4	6	4	1	1	21
2			J	4	1	1	22
2			CF	4	1	1	23
2			CF	4	1	1	24
8	983	4	4	4	1	1	21
8			974	4	1	1	22
8			986	4	1	1	23
8			CF	4	1	1	24
86	961	4	1	4	2	1	22
86			968	4	2	1	23
86			981	4	2	1	24

148	519	4	894	4	3	2	24
95	871	4		4	4	4	22
95			871	4	4	4	23
95			989	4	4	4	24
15	1131	4	1322	4	1	5	13
15			1089	4	1	5	14
15			CF	4	1	5	15
15			CF	4	1	5	16
15			CF	4	1	5	21
15			CF	4	1	5	22
15			CF	4	1	5	23
15			CF	4	1	5	24
27	975	4	1135	4	1	5	13
27			951	4	1	5	14
27			CF	4	1	5	15
27			CF	4	1	5	16
27			CF	4	1	5	21
27			CF	4	1	5	22
27			CF	4	1	5	23
27			CF	4	1	5	24
50	940	4	8	4	1	6	12
50			CF	4	1	6	13
50			CF	4	1	6	14
50			CF	4	1	6	15
50			CF	4	1	6	16
50			CF	4	1	6	21
50			CF	4	1	6	22
50			CF	4	1	6	23
50			CF	4	1	6	24
59	978	4	5	4	2	6	22
59			J	4	1	6	23
59			CF	4	1	6	24
142	955	4	1	4	5	6	22
142			J	4	1	6	23
142			CF	4	1	6	24
149	954	4	1	4	3	6	22
149			J	4	3	6	23

149			CF	4	3	6	24
152	660	4	955	4	5	6	24
153	943	4	1097	4	5	6	22
153			J	4	5	6	23
153			CF	4	5	6	24
167	987	4	1	4	6	6	22
167			J	4	6	6	23
167			CF	4	6	6	24
27	1000	5	44	5	1	7	12
27			CF	5	1	7	13
27			CF	5	1	7	14
27			CF	5	1	7	15
27			CF	5	1	7	16
27			CF	5	1	7	21
27			CF	5	1	7	22
27			CF	5	1	7	23
27			CF	5	1	7	24
60		5	40	5	2	7	11
60			42	5	2	7	13
60			41	5	2	7	14
60			CF	5	2	7	15
60			CF	5	2	7	16
60			CF	5	2	7	21
60			CF	5	2	7	22
60			CF	5	2	7	23
60			CF	5	2	7	24
63	1030	5	45	5	1	7	21
63			21	5	1	7	22
63			J	5	1	7	23
63			CF	5	1	7	24
65	1008	5	41	5	2	7	16
65			976	5	1	7	21
65			42	5	1	7	22
65			J	5	1	7	23
65			CF	5	1	7	24

69		5	40	5	2	7	11
69			989	5	2	7	13
69			43	5	2	7	14
69			CF	5	2	7	15
69			CF	5	2	7	16
69			CF	5	2	7	21
69			CF	5	2	7	22
69			CF	5	2	7	23
69			CF	5	2	7	24
70		5	40	5	2	7	11
70			J	5	2	7	13
70			J	5	2	7	14
70			CF	5	2	7	15
70			CF	5	2	7	16
70			CF	5	2	7	21
70			CF	5	2	7	22
70			CF	5	2	7	23
70			CF	5	2	7	24
71	940	5	38	5	2	7	14
71			948	5	2	7	15
71			37	5	2	7	16
71			J	5	1	7	21
71			37	5	1	7	22
71			J	5	1	7	23
71			CF	5	1	7	24
81		5	40	5	2	7	11
81			48	5	2	7	13
81			47	5	2	7	14
81			CF	5	2	7	15
81			CF	5	2	7	16
81			CF	5	2	7	21
81			CF	5	2	7	22
81			CF	5	2	7	23
81			CF	5	2	7	24
92		5	40	5	2	7	11
92			45	5	2	7	13
92			44	5	2	7	14
92			CF	5	2	7	15
92			CF	5	2	7	16
92			CF	5	2	7	21
92			CF	5	2	7	22
92			CF	5	2	7	23
92			CF	5	2	7	24
127	951	5	45	5	1	7	21

127			47	5	1	7	22
127			J	5	1	7	23
127			CF	5	1	7	24
128	1011	5	42	5	1	7	21
128			44	5	1	7	22
128			J	5	1	7	23
128			CF	5	1	7	24
131	1040	5	41	5	1	7	21
131			1052	5	1	7	22
131			J	5	1	7	23
131			CF	5	1	7	24
134		5	40	5	5	7	11
134			45	5	1	7	21
134			CF	5	1	7	22
134			CF	5	1	7	23
134			CF	5	1	7	24
135	979	5	38	5	5	7	22
135			J	5	1	7	23
135			CF	5	1	7	24
148		5	30	5	5	7	11
148			38	5	3	7	21
148			J	5	3	7	22
148			J	5	3	7	23
148			CF	5	3	7	24
1	890	4	1140	4	1	9	16
1			885	4	1	9	21
1			895	4	1	9	22
1			900	4	1	9	23
1			893	4	1	9	24
3	864	4	1061	4	1	9	16
3			805	4	1	9	21
3			805	4	1	9	22
3			809	4	1	9	23
3			807	4	1	9	24
4	842	4	991	4	1	9	16

4			835	4	1	9	21
4			836	4	1	9	22
4			843	4	1	9	23
4			840	4	1	9	24
5	937	4	1367	4	1	9	16
5			933	4	1	9	21
5			936	4	1	9	22
5			935	4	1	9	23
5			921	4	1	9	24
7	875	4	1122	4	1	9	16
7			877	4	1	9	21
7			883	4	1	9	22
7			888	4	1	9	23
7			879	4	1	9	24
8	885	4	1096	4	1	9	16
8			853	4	1	9	21
8			851	4	1	9	22
8			863	4	1	9	23
8			851	4	1	9	24
10	871	4	1203	4	1	9	16
10			865	4	1	9	21
10			865	4	1	9	22
10			871	4	1	9	23
10			862	4	1	9	24
11	845	4	1108	4	1	9	16
11			855	4	1	9	21
11			851	4	1	9	22
11			856	4	1	9	23
11			831	4	1	9	24
12	974	4	813	4	1	9	21
12			811	4	1	9	22
12			815	4	1	9	23
12			814	4	1	9	24
14	820	4	1064	4	1	9	16
14			800	4	1	9	21
14			803	4	1	9	22
14			806	4	1	9	23

14			801	4	1	9	24
15	900	4	1059	4	1	9	16
15			843	4	1	9	21
15			832	4	1	9	22
15			833	4	1	9	23
15			828	4	1	9	24
18	865	4	1201	4	1	9	16
18			788	4	1	9	21
18			789	4	1	9	22
18			781	4	1	9	23
18			767	4	1	9	24
19	876	4	1168	4	1	9	16
19			877	4	1	9	21
19			868	4	1	9	22
19			875	4	1	9	23
19			873	4	1	9	24
20	865	4	1047	4	1	9	16
20			866	4	1	9	21
20			864	4	1	9	22
20			870	4	1	9	23
20			868	4	1	9	24
21	892	4	1295	4	1	9	16
21			905	4	1	9	21
21			899	4	1	9	22
21			904	4	1	9	23
21			904	4	1	9	24
22	858	4	994	4	1	9	16
22			755	4	1	9	21
22			755	4	1	9	22
22			763	4	1	9	23
22			CF	4	1	9	24
23	932	4	1202	4	1	9	16
23			945	4	1	9	21
23			947	4	1	9	22
23			958	4	1	9	23
23			962	4	1	9	24

24	877	4	1298	4	1	9	16
24			844	4	1	9	21
24			831	4	1	9	22
24			836	4	1	9	23
24			837	4	1	9	24
25	828	4	1029	4	1	9	16
25			840	4	1	9	21
25			841	4	1	9	22
25			852	4	1	9	23
25			857	4	1	9	24
26	826	4	1220	4	1	9	16
26			781	4	3	9	21
26			775	4	3	9	22
26			767	4	3	9	23
26			775	4	3	9	24
27	841	4	1232	4	1	9	16
27			797	4	3	9	21
27			804	4	3	9	22
27			791	4	3	9	23
27			789	4	3	9	24
28	875	4	1219	4	1	9	16
28			770	4	3	9	21
28			737	4	3	9	22
28			715	4	3	9	23
28			720	4	3	9	24
31	876	4	1134	4	1	9	16
31			837	4	5	9	21
31			821	4	5	9	22
31			812	4	5	9	23
31			820	4	5	9	24
32	868	4	1218	4	1	9	16
32			846	4	5	9	21
32			851	4	5	9	22
32			847	4	5	9	23
32			843	4	5	9	24
33	944	4	724	4	5	9	21
33			721	4	5	9	22

33			722	4	5	9	23
33			729	4	5	9	24
35	875	4	1040	4	1	9	16
35			859	4	5	9	21
35			853	4	5	9	22
35			857	4	5	9	23
35			863	4	5	9	24
37	880	4	1218	4	1	9	16
37			906	4	2	9	21
37			893	4	2	9	22
37			925	4	2	9	23
37			935	4	2	9	24
38	836	4	1035	4	1	9	16
38			861	4	2	9	21
38			854	4	2	9	22
38			873	4	2	9	23
38			891	4	2	9	24
39	834	4	1266	4	1	9	16
39			743	4	2	9	21
39			748	4	2	9	22
39			758	4	2	9	23
39			768	4	2	9	24
40	870	4	1211	4	1	9	16
40			915	4	2	9	21
40			900	4	2	9	22
40			920	4	2	9	23
40			936	4	2	9	24
41	841	4	1402	4	1	9	16
41			734	4	4	9	21
41			741	4	4	9	22
41			748	4	4	9	23
41			744	4	4	9	24
42	899	4	1095	4	1	9	16
42			959	4	4	9	21
42			961	4	4	9	22
42			981	4	4	9	23
42			975	4	4	9	24

43	832	4	1045	4	1	9	16
43			868	4	4	9	21
43			869	4	4	9	22
43			887	4	4	9	23
43			878	4	4	9	24
44	827	4	1081	4	1	9	16
44			855	4	4	9	21
44			853	4	4	9	22
44			868	4	4	9	23
44			862	4	4	9	24
45	883	4	1094	4	1	9	16
45			931	4	4	9	21
45			929	4	4	9	22
45			950	4	4	9	23
45			940	4	4	9	24
47	888	4	1112	4	1	9	16
47			952	4	6	9	21
47			944	4	6	9	22
47			951	4	6	9	23
47			939	4	6	9	24
48	844	4	1004	4	1	9	16
48			873	4	6	9	21
48			873	4	6	9	22
48			894	4	6	9	23
48			880	4	6	9	24
50	851	4	1209	4	1	9	16
50			880	4	6	9	21
50			877	4	6	9	22
50			899	4	6	9	23
50			888	4	6	9	24
54	884	4	1021	4	2	9	16
54			718	4	1	9	21
54			721	4	1	9	22
54			722	4	1	9	23
54			CF	4	1	9	24
56	915	4	1187	4	2	9	16
56			877	4	1	9	21

56			878	4	1	9	22
56			878	4	1	9	23
56			882	4	1	9	24
57	898	4	1248	4	2	9	16
57			869	4	1	9	21
57			884	4	1	9	22
57			878	4	1	9	23
57			876	4	1	9	24
59	981	4	1203	4	2	9	16
59			960	4	1	9	21
59			977	4	1	9	22
59			979	4	1	9	23
59			984	4	1	9	24
60	888	4	1197	4	2	9	16
60			753	4	1	9	21
60			758	4	1	9	22
60			760	4	1	9	23
60			754	4	1	9	24
61	909	4	1130	4	2	9	16
61			854	4	1	9	21
61			866	4	1	9	22
61			867	4	1	9	23
61			872	4	1	9	24
62	943	4	1158	4	2	9	16
62			890	4	1	9	21
62			896	4	1	9	22
62			902	4	1	9	23
62			894	4	1	9	24
63	940	4	797	4	1	9	21
63			793	4	1	9	22
63			789	4	1	9	23
63			791	4	1	9	24
64	889	4	1285	4	2	9	16
64			646	4	1	9	21
64			643	4	1	9	22
64			631	4	1	9	23
64			625	4	1	9	24

65	879	4	1197	4	2	9	16
65			834	4	1	9	21
65			846	4	1	9	22
65			848	4	1	9	23
65			830	4	1	9	24
66	924	4	1231	4	2	9	16
66			936	4	1	9	21
66			944	4	1	9	22
66			943	4	1	9	23
66			929	4	1	9	24
69	925	4	1184	4	2	9	16
69			915	4	1	9	21
69			939	4	1	9	22
69			939	4	1	9	23
69			932	4	1	9	24
70	885	4	1115	4	2	9	16
70			835	4	1	9	21
70			829	4	1	9	22
70			826	4	1	9	23
70			825	4	1	9	24
71	873	4	1153	4	2	9	16
71			744	4	1	9	21
71			738	4	1	9	22
71			735	4	1	9	23
71			737	4	1	9	24
72	919	4	1164	4	2	9	16
72			902	4	1	9	21
72			917	4	1	9	22
72			919	4	1	9	23
72			923	4	1	9	24
73	927	4	1157	4	2	9	16
73			880	4	1	9	21
73			886	4	1	9	22
73			887	4	1	9	23
73			881	4	1	9	24
75	888	4	1030	4	2	9	16
75			850	4	1	9	21

75			852	4	1	9	22
75			860	4	1	9	23
75			861	4	1	9	24
76	878	4	1035	4	2	9	16
76			854	4	3	9	21
76			847	4	3	9	22
76			836	4	3	9	23
76			838	4	3	9	24
77	874	4	1184	4	2	9	16
77			798	4	3	9	21
77			803	4	3	9	22
77			796	4	3	9	23
77			794	4	3	9	24
78	878	4	1100	4	2	9	16
78			773	4	3	9	21
78			775	4	3	9	22
78			770	4	3	9	23
78			763	4	3	9	24
84	1061	4	881	4	5	9	21
84			882	4	5	9	22
84			885	4	5	9	23
84			879	4	5	9	24
169	945	4	1112	4	6	9	23
169			952	4	6	9	24

Item No.	Prior Meas.	Exp.	Post P. F. Meas.	Exp.		Group No.	Mfg.
21	96	4	275	4	1	0	22
21			136	4	1	0	23
21			142	4	1	0	24
167	52	4	112	4	6	0	21
167			105	4	6	0	22
167			112	4	6	0	23
167			95	4	6	0	24
2	57	4	540	4	1	1	16
2			158	4	1	1	21
2			J	4	1	1	22
2			CF	4	1	1	23
2			CF	4	1	1	24
8	56	4	190	4	1	1	15
8			59	4	1	1	16
8			203	4	1	1	21
8			57	4	1	1	22
8			63	4	1	1	23
8			CF	4	1	1	24
16	69	4	153	4	1	1	15
16			CF	4	1	1	16
16			CF	4	1	1	21
16			CF	4	1	1	22
16			CF	4	1	1	23
16			CF	4	1	1	24
33	48	4	175	4	5	1	23
33			53	4	5	1	24
38	54	4	456	4	2	1	22
38			720	4	2	1	23
38			CF	4	2	1	24

45	53	4	520	4	4	1	23
45			82	4	4	1	24
46	52	4	295	4	6	1	23
46			56	4	6	1	24
70	54	4	150	4	1	1	23
70			J	4	1	1	24
86	57	4	203	4	2	1	22
86			60	4	2	1	23
86			1050	4	2	1	24
90	62	4	800	4	2	1	24
93	53	4	540	4	4	1	23
93			CF	4	4	1	24
4	69	4	495	4	1	2	16
4			62	4	1	2	21
4			62	4	1	2	22
4			68	4	1	2	23
4			67	4	1	2	24
33	68	4	207	4	1	2	16
33			59	4	5	2	21
33			62	4	5	2	22
33			65	4	5	2	23
33			67	4	5	2	24
44	62	4	205	4	1	2	16
44			72	4	4	2	21
44			55	4	4	2	22
44			55	4	4	2	23
44			64	4	4	2	24
50	65	4	147	4	1	2	16
50			63	4	6	2	21
50			61	4	6	2	22
50			68	4	6	2	23

50			62	4	6	2	24
99	56	4	120	4	6	2	21
99			54	4	6	2	22
99			55	4	6	2	23
99			54	4	6	2	24
129	56	4	471	4	1	2	22
129			67	4	1	2	23
129			66	4	1	2	24
148	1	4	9200	4	3	2	23
148			1350	4	3	2	24
11	163	4	320	4	1	3	16
11			157	4	1	3	21
11			172	4	1	3	22
11			185	4	1	3	23
11			160	4	1	3	24
82	150	4	922	4	5	3	23
82			147	4	5	3	24
98	155	4	430	4	2	3	16
98			268	4	6	3	21
98			CF	4	6	3	22
98			CF	4	6	3	23
98			CF	4	6	3	24
100	164	4	420	4	2	3	16
100			CF	4	6	3	21
100			CF	4	6	3	22
100			CF	4	6	3	23
100			CF	4	6	3	24
53	67	4	505	4	1	4	16
53			68	4	1	4	21
53			64	4	1	4	22
53			65	4	1	4	23
53			76	4	1	4	24

57	56	4	164	4	1	4	16
57			56	4	1	4	21
57			56	4	1	4	22
57			62	4	1	4	23
57			63	4	1	4	24
2	59	4	119	4	2	4	16
2			63	4	1	4	21
2			57	4	1	4	22
2			63	4	1	4	23
2			66	4	1	4	24
4	57	4	172	4	1	4	24
5	56	4	288	4	2	4	16
5			53	4	1	4	21
5			54	4	1	4	22
5			57	4	1	4	23
5			60	4	1	4	24
78	59	4	173	4	2	4	16
78			57	4	3	4	21
78			58	4	3	4	22
78			57	4	3	4	23
78			62	4	3	4	24
91	62	4	127	4	2	4	16
91			57	4	4	4	21
91			53	4	4	4	22
91			57	4	4	4	23
91			65	4	4	4	24
95	52	4	356	4	4	4	22
95			56	4	4	4	23
95			65	4	4	4	24
9	163	4	393	4	1	5	16
9			CF	4	1	5	21
9			CF	4	1	5	22
9			CF	4	1	5	23
9			CF	4	1	5	24
10	163	4	320	4	1	5	16

10			CF	4	1	5	21
10			CF	4	1	5	22
10			CF	4	1	5	23
10			CF	4	1	5	24
12	165	4	633	4	1	5	16
12			CF	4	1	5	21
12			CF	4	1	5	22
12			CF	4	1	5	23
12			CF	4	1	5	24
18	164	4	380	4	1	5	16
18			160	4	1	5	21
18			163	4	1	5	22
18			175	4	1	5	23
18			165	4	1	5	24
22	169	4	465	4	1	5	16
22			CF	4	1	5	21
22			CF	4	1	5	22
22			CF	4	1	5	23
22			CF	4	1	5	24
27	188	4	505	4	1	5	12
27			J	4	1	5	13
27			422	4	1	5	14
27			CF	4	1	5	15
27			CF	4	1	5	16
27			CF	4	3	5	21
27			CF	4	3	5	22
27			CF	4	3	5	23
27			CF	4	3	5	24
28	152	4	625	4	1	5	15
28			225	4	1	5	16
28			162	4	3	5	21
28			163	4	3	5	22
28			175	4	3	5	23
28			170	4	3	5	24
32	157	4	555	4	1	5	16
32			CF	4	5	5	21
32			CF	4	5	5	22
32			CF	4	5	5	23
32			CF	4	5	5	24

38	160	4	500	4	1	5	16
38			CF	4	2	5	21
38			CF	4	2	5	22
38			CF	4	2	5	23
38			CF	4	2	5	24
41	160	4	373	4	1	5	16
41			CF	4	4	5	21
41			CF	4	4	5	22
41			CF	4	4	5	23
41			CF	4	4	5	24
44	157	4	323	4	1	5	16
44			159	4	4	5	21
44			CF	4	4	5	22
44			CF	4	4	5	23
44			CF	4	4	5	24
48	158	4	330	4	1	5	16
48			184	4	6	5	21
48			172	4	6	5	22
48			188	4	6	5	23
48			175	4	6	5	24
52	172	4	360	4	2	5	16
52			163	4	1	5	21
52			172	4	1	5	22
52			185	4	1	5	23
52			180	4	1	5	24
53	162	4	340	4	2	5	16
53			CF	4	1	5	21
53			CF	4	1	5	22
53			CF	4	1	5	23
53			CF	4	1	5	24
57	166	4	320	4	2	5	16
57			CF	4	1	5	21
57			CF	4	1	5	22
57			CF	4	1	5	23
57			CF	4	1	5	24
60	169	4	340	4	2	5	16
60			CF	4	1	5	21

60			CF	4	1	5	22
60			CF	4	1	5	23
60			CF	4	1	5	24
62	280	4	522	4	1	5	21
62			155	4	1	5	22
62			175	4	1	5	23
62			CF	4	1	5	24
67	168	4	400	4	2	5	16
67			CF	4	1	5	21
67			CF	4	1	5	22
67			CF	4	1	5	23
67			CF	4	1	5	24
71	162	4	363	4	2	5	16
71			CF	4	1	5	21
71			CF	4	1	5	22
71			CF	4	1	5	23
71			CF	4	1	5	24
72	170	4	315	4	2	5	16
72			CF	4	1	5	21
72			CF	4	1	5	22
72			CF	4	1	5	23
72			CF	4	1	5	24
73	163	4	413	4	2	5	16
73			CF	4	1	5	21
73			CF	4	1	5	22
73			CF	4	1	5	23
73			CF	4	1	5	24
88	163	4	330	4	2	5	16
88			176	4	2	5	21
88			162	4	2	5	22
88			195	4	2	5	23
88			193	4	2	5	24
96	167	4	382	4	2	5	16
96			183	4	6	5	21
96			CF	4	6	5	22
96			CF	4	6	5	23
96			CF	4	6	5	24

152	1	4	1540	4	5	6	23
152			65	4	5	6	24
153	46	4	398	4	5	6	21
153			J	4	5	6	22
153			J	4	5	6	23
153			CF	4	5	6	24
160	61	4	1760	4	2	6	24
2	139	4	318	4	1	7	16
2			137	4	1	7	21
2			137	4	1	7	22
2			140	4	1	7	23
2			140	4	1	7	24
7	135	4	320	4	1	7	16
7			137	4	1	7	21
7			136	4	1	7	22
7			135	4	1	7	23
7			140	4	1	7	24
9	137	4	344	4	1	7	16
9			144	4	1	7	21
9			146	4	1	7	22
9			143	4	1	7	23
9			145	4	1	7	24
14	138	4	652	4	1	7	16
14			138	4	1	7	21
14			140	4	1	7	22
14			142	4	1	7	23
14			142	4	1	7	24
16	139	4	365	4	1	7	16
16			140	4	1	7	21
16			138	4	1	7	22
16			142	4	1	7	23
16			142	4	1	7	24
17	142	4	310	4	1	7	16
17			138	4	1	7	21

151	148	4	488	4	5	5	21
151			CF	4	5	5	22
151			CF	4	5	5	23
151			CF	4	5	5	24
1	58	4	243	4	1	6	16
1			J	4	1	6	21
1			190	4	1	6	22
1			CF	4	1	6	23
1			CF	4	1	6	24
29	53	4	240	4	3	6	24
50	62	4	484	4	1	6	12
50			J	4	1	6	13
50			CF	4	1	6	14
50			CF	4	1	6	15
50			CF	4	1	6	16
50			CF	4	6	6	21
50			CF	4	6	6	22
50			CF	4	6	6	23
50			CF	4	6	6	24
59	72	4	630	4	1	6	21
59			85	4	2	6	22
59			J	4	1	6	23
59			CF	4	1	6	24
71	62	4	510	4	1	6	21
71			365	4	1	6	22
71			63	4	1	6	23
71			100	4	1	6	24
93	58	4	223	4	4	6	24
142	89	4	202	4	5	6	22
142			J	4	1	6	23
142			CF	4	1	6	24
149	54	4	172	4	3	6	22
149			J	4	3	6	23
149			CF	4	3	6	24

17			138	4	1	7	22
17			138	4	1	7	23
17			140	4	1	7	24
19	144	4	464	4	1	7	16
19			142	4	1	7	21
19			137	4	1	7	22
19			138	4	1	7	23
19			140	4	1	7	24
21	144	4	370	4	1	7	16
21			142	4	1	7	21
21			142	4	1	7	22
21			143	4	1	7	23
21			144	4	1	7	24
24	47	4	130	4	1	7	21
24			137	4	1	7	22
24			141	4	1	7	23
24			145	4	1	7	24
28	137	4	344	4	1	7	16
28			136	4	3	7	21
28			136	4	3	7	22
28			133	4	3	7	23
28			140	4	3	7	24
30	141	4	920	4	1	7	16
30			136	4	3	7	21
30			136	4	3	7	22
30			135	4	3	7	23
30			142	4	3	7	24
34	136	4	298	4	1	7	16
34			137	4	5	7	21
34			133	4	5	7	22
34			122	4	5	7	23
34			127	4	5	7	24
39	136	4	324	4	1	7	16
39			136	4	2	7	21
39			134	4	2	7	22
39			132	4	2	7	23
39			142	4	2	7	24

45	56	4	166	4	4	7	22
45			155	4	4	7	23
45			155	4	4	7	24
71	147	4	630	4	2	7	14
71			142	4	2	7	15
71			152	4	2	7	16
71			J	4	1	7	21
71			145	4	1	7	22
71			J	4	1	7	23
71			CF	4	1	7	24
82	211	4	322	4	5	7	23
82			130	4	5	7	24
166	137	4	430	4	6	7	23
166			137	4	6	7	24
42	164	4	600	4	4	8	22
42			CF	4	4	8	23
42			CF	4	4	8	24
1	54	4	169	4	1	9	15
1			1270	4	1	9	16
1			220	4	1	9	21
1			235	4	1	9	22
1			176	4	1	9	23
1			68	4	1	9	24
3	62	4	1180	4	1	9	16
3			86	4	1	9	21
3			78	4	1	9	22
3			72	4	1	9	23
3			67	4	1	9	24
4	65	4	800	4	1	9	16
4			107	4	1	9	21
4			76	4	1	9	22
4			75	4	1	9	23
4			70	4	1	9	24
5	50	4	125	4	1	9	15

5			1640	4	1	9	16
5			273	4	1	9	21
5			300	4	1	9	22
5			210	4	1	9	23
5			72	4	1	9	24
7	48	4	120	4	1	9	15
7			1380	4	1	9	16
7			215	4	1	9	21
7			259	4	1	9	22
7			195	4	1	9	23
7			65	4	1	9	24
8	83	4	168	4	1	9	15
8			1180	4	1	9	16
8			324	4	1	9	21
8			292	4	1	9	22
8			310	4	1	9	23
8			205	4	1	9	24
9	62	4	502	4	1	9	16
9			870	4	1	9	21
9			66	4	1	9	22
9			65	4	1	9	23
9			65	4	1	9	24
10	52	4	173	4	1	9	15
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10			240	4	1	9	22
10			230	4	1	9	23
10			98	4	1	9	24
11	52	4	352	4	1	9	15
11			7300	4	1	9	16
11			484	4	1	9	21
11			456	4	1	9	22
11			430	4	1	9	23
11			205	4	1	9	24
12	82	4	845	4	1	9	16
12			146	4	1	9	21
12			122	4	1	9	22
12			95	4	1	9	23
12			66	4	1	9	24

13	72	4	179	4	1	9	15
13			CF	4	1	9	16
13			CF	4	1	9	21
13			CF	4	1	9	22
13			CF	4	1	9	23
13			CF	4	1	9	24
14	86	4	900	4	1	9	16
14			215	4	1	9	21
14			262	4	1	9	22
14			185	4	1	9	23
14			90	4	1	9	24
15	66	4	760	4	1	9	16
15			67	4	1	9	21
15			62	4	1	9	22
15			65	4	1	9	23
15			61	4	1	9	24
16	63	4	174	4	1	9	16
16			67	4	1	9	21
16			64	4	1	9	22
16			72	4	1	9	23
16			67	4	1	9	24
17	62	4	530	4	1	9	16
17			84	4	1	9	21
17			69	4	1	9	22
17			72	4	1	9	23
17			68	4	1	9	24
18	114	4	352	4	1	9	15
18			1450	4	1	9	16
18			450	4	1	9	21
18			482	4	1	9	22
18			320	4	1	9	23
18			107	4	1	9	24
19	55	4	180	4	1	9	15
19			1350	4	1	9	16
19			225	4	1	9	21
19			132	4	1	9	22
19			100	4	1	9	23
19			65	4	1	9	24

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20			103	4	1	9	21
20			100	4	1	9	22
20			82	4	1	9	23
20			65	4	1	9	24
21	94	4	1340	4	1	9	16
21			158	4	1	9	21
21			119	4	1	9	22
21			92	4	1	9	23
21			72	4	1	9	24
22	60	4	748	4	1	9	16
22			68	4	1	9	21
22			62	4	1	9	22
22			76	4	1	9	23
22			CF	4	1	9	24
23	62	4	134	4	1	9	15
23			1240	4	1	9	16
23			123	4	1	9	21
23			120	4	1	9	22
23			93	4	1	9	23
23			67	4	1	9	24
24	52	4	115	4	1	9	15
24			1600	4	1	9	16
24			252	4	1	9	21
24			185	4	1	9	22
24			125	4	1	9	23
24			70	4	1	9	24
25	74	4	9280	4	1	9	16
25			104	4	1	9	21
25			112	4	1	9	22
25			80	4	1	9	23
25			70	4	1	9	24
26	79	4	2020	4	1	9	16
26			102	4	3	9	21
26			106	4	3	9	22
26			95	4	3	9	23
26			100	4	3	9	24
27	64	4	172	4	1	9	15

27			1590	4	1	9	16
27			442	4	3	9	21
27			558	4	3	9	22
27			480	4	3	9	23
27			390	4	3	9	24
28	308	4	1380	4	1	9	16
28			485	4	3	9	21
28			232	4	3	9	22
28			126	4	3	9	23
28			104	4	3	9	24
29	56	4	233	4	1	9	15
29			CF	4	1	9	16
29			CF	4	3	9	21
29			CF	4	3	9	22
29			CF	4	3	9	23
29			CF	4	3	9	24
31	60	4	193	4	1	9	15
31			1330	4	1	9	16
31			403	4	5	9	21
31			436	4	5	9	22
31			395	4	5	9	23
31			362	4	5	9	24
32	62	4	146	4	1	9	15
32			1370	4	1	9	16
32			292	4	5	9	21
32			366	4	5	9	22
32			305	4	5	9	23
32			204	4	5	9	24
33	66	4	965	4	1	9	16
33			238	4	5	9	21
33			253	4	5	9	22
33			241	4	5	9	23
33			272	4	5	9	24
34	64	4	585	4	1	9	16
34			112	4	5	9	21
34			111	4	5	9	22
34			105	4	5	9	23
34			115	4	5	9	24

35	54	4	135	4	1	9	15
35			1040	4	1	9	16
35			176	4	5	9	21
35			187	4	5	9	22
35			153	4	5	9	23
35			170	4	5	9	24
37	77	4	1070	4	1	9	16
37			265	4	2	9	21
37			318	4	2	9	22
37			370	4	2	9	23
37			270	4	2	9	24
38	94	4	1190	4	1	9	16
38			148	4	2	9	21
38			187	4	2	9	22
38			130	4	2	9	23
38			85	4	2	9	24
39	104	4	1570	4	1	9	16
39			323	4	2	9	21
39			378	4	2	9	22
39			300	4	2	9	23
39			172	4	2	9	24
40	77	4	278	4	1	9	15
40			1490	4	1	9	16
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41			83	4	4	9	21
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41			77	4	4	9	23
41			85	4	4	9	24
42	161	4	1080	4	1	9	16
42			83	4	4	9	21
42			112	4	4	9	22
42			142	4	4	9	23
42			138	4	4	9	24

43	69	4	1230	4	1	9	16
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43			78	4	4	9	23
43			67	4	4	9	24
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45	82	4	925	4	1	9	16
45			98	4	4	9	21
45			82	4	4	9	22
45			86	4	4	9	23
45			75	4	4	9	24
46	118	4	885	4	1	9	16
46			126	4	6	9	21
46			185	4	6	9	22
46			195	4	6	9	23
46			202	4	6	9	24
47	76	4	162	4	1	9	15
47			1380	4	1	9	16
47			366	4	6	9	21
47			336	4	6	9	22
47			165	4	6	9	23
47			110	4	6	9	24
48	106	4	970	4	1	9	16
48			92	4	6	9	21
48			118	4	6	9	22
48			90	4	6	9	23
48			72	4	6	9	24
49	64	4	242	4	1	9	16
49			71	4	6	9	21
49			64	4	6	9	22
49			80	4	6	9	23
49			63	4	6	9	24
50	109	4	1420	4	1	9	16

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50			72	4	6	9	22
50			80	4	6	9	23
50			67	4	6	9	24
52	97	4	535	4	2	9	16
52			130	4	1	9	21
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53	76	4	248	4	2	9	16
53			75	4	1	9	21
53			68	4	1	9	22
53			75	4	1	9	23
53			80	4	1	9	24
54	72	4	169	4	2	9	15
54			970	4	2	9	16
54			184	4	1	9	21
54			201	4	1	9	22
54			206	4	1	9	23
54			CF	4	1	9	24
55	106	4	850	4	2	9	16
55			65	4	1	9	21
55			64	4	1	9	22
55			74	4	1	9	23
55			75	4	1	9	24
56	112	4	950	4	2	9	16
56			111	4	1	9	21
56			116	4	1	9	22
56			95	4	1	9	23
56			80	4	1	9	24
57	127	4	1220	4	2	9	16
57			212	4	1	9	21
57			288	4	1	9	22
57			219	4	1	9	23
57			105	4	1	9	24
59	61	4	242	4	2	9	15
59			1070	4	2	9	16

59			78	4	1	9	21
59			140	4	1	9	22
59			110	4	1	9	23
59			70	4	1	9	24
60	51	4	222	4	2	9	15
60			1400	4	2	9	16
60			330	4	1	9	21
60			371	4	1	9	22
60			355	4	1	9	23
60			263	4	1	9	24
61	88	4	950	4	2	9	16
61			96	4	1	9	21
61			104	4	1	9	22
61			87	4	1	9	23
61			75	4	1	9	24
62	52	4	283	4	2	9	15
62			1220	4	2	9	16
62			207	4	1	9	21
62			262	4	1	9	22
62			260	4	1	9	23
62			132	4	1	9	24
63	68	4	502	4	2	9	16
63			77	4	1	9	21
63			69	4	1	9	22
63			70	4	1	9	23
63			67	4	1	9	24
64	163	4	1440	4	2	9	16
64			366	4	1	9	21
64			328	4	1	9	22
64			159	4	1	9	23
64			110	4	1	9	24
65	70	4	194	4	2	9	15
65			1230	4	2	9	16
65			385	4	1	9	21
65			455	4	1	9	22
65			430	4	1	9	23
65			208	4	1	9	24
66	52	4	193	4	2	9	15

66			1270	4	2	9	16
66			353	4	1	9	21
66			382	4	1	9	22
66			352	4	1	9	23
66			170	4	1	9	24
67	166	4	780	4	2	9	16
67			128	4	1	9	21
67			135	4	1	9	22
67			155	4	1	9	23
67			95	4	1	9	24
68	69	4	343	4	2	9	15
68			980	4	2	9	16
68			68	4	1	9	21
68			92	4	1	9	22
68			91	4	1	9	23
68			76	4	1	9	24
69	56	4	209	4	2	9	15
69			1280	4	2	9	16
69			195	4	1	9	21
69			312	4	1	9	22
69			275	4	1	9	23
69			115	4	1	9	24
70	68	4	185	4	2	9	15
70			1180	4	2	9	16
70			533	4	1	9	21
70			470	4	1	9	22
70			400	4	1	9	23
70			390	4	1	9	24
71	102	4	318	4	2	9	15
71			1580	4	2	9	16
71			145	4	1	9	21
71			106	4	1	9	22
71			90	4	1	9	23
71			81	4	1	9	24
72	53	4	130	4	2	9	15
72			1120	4	2	9	16
72			95	4	1	9	21
72			172	4	1	9	22
72			105	4	1	9	23
72			80	4	1	9	24

73	52	4	362	4	2	9	15
73			1260	4	2	9	16
73			243	4	1	9	21
73			294	4	1	9	22
73			235	4	1	9	23
73			80	4	1	9	24
74	88	4	400	4	2	9	16
74			89	4	1	9	21
74			86	4	1	9	22
74			95	4	1	9	23
74			94	4	1	9	24
75	47	4	139	4	2	9	15
75			990	4	2	9	16
75			62	4	1	9	21
75			59	4	1	9	22
75			72	4	1	9	23
75			70	4	1	9	24
76	53	4	208	4	2	9	15
76			950	4	2	9	16
76			502	4	3	9	21
76			475	4	3	9	22
76			410	4	3	9	23
76			395	4	3	9	24
77	52	4	190	4	2	9	15
77			1370	4	2	9	16
77			198	4	3	9	21
77			310	4	3	9	22
77			240	4	3	9	23
77			127	4	3	9	24
78	54	4	172	4	2	9	15
78			1120	4	2	9	16
78			393	4	3	9	21
78			423	4	3	9	22
78			382	4	3	9	23
78			282	4	3	9	24
81	86	4	208	4	2	9	16
81			68	4	5	9	21
81			78	4	5	9	22
81			82	4	5	9	23
81			85	4	5	9	24

83	68	4	146	4	2	9	16
83			57	4	5	9	21
83			57	4	5	9	22
83			70	4	5	9	23
83			78	4	5	9	24
84	164	4	722	4	2	9	16
84			292	4	5	9	21
84			344	4	5	9	22
84			312	4	5	9	23
84			240	4	5	9	24
85	94	4	476	4	2	9	16
85			78	4	5	9	21
85			86	4	5	9	22
85			85	4	5	9	23
85			82	4	5	9	24
86	72	4	249	4	2	9	16
86			78	4	2	9	21
86			73	4	2	9	22
86			80	4	2	9	23
86			96	4	2	9	24
88	62	4	243	4	2	9	16
88			82	4	2	9	21
88			77	4	2	9	22
88			80	4	2	9	23
88			97	4	2	9	24
89	60	4	231	4	2	9	16
89			91	4	2	9	21
89			85	4	2	9	22
89			82	4	2	9	23
89			123	4	2	9	24
90	72	4	520	4	2	9	16
90			82	4	2	9	21
90			72	4	2	9	22
90			75	4	2	9	23
90			88	4	2	9	24
91	102	4	500	4	2	9	16
91			93	4	4	9	21

91			102	4	4	9	22
91			98	4	4	9	23
91			83	4	4	9	24
93	63	4	194	4	2	9	16
93			107	4	4	9	21
93			102	4	4	9	22
93			104	4	4	9	23
93			96	4	4	9	24
94	67	4	210	4	2	9	16
94			95	4	4	9	21
94			93	4	4	9	22
94			100	4	4	9	23
94			102	4	4	9	24
96	67	4	162	4	2	9	16
96			86	4	6	9	21
96			78	4	6	9	22
96			90	4	6	9	23
96			85	4	6	9	24
98	82	4	400	4	2	9	16
98			92	4	6	9	21
98			82	4	6	9	22
98			88	4	6	9	23
98			75	4	6	9	24
100	73	4	310	4	2	9	16
100			88	4	6	9	21
100			94	4	6	9	22
100			86	4	6	9	23
100			70	4	6	9	24

Item No.	Prior Meas.	Exp.	Post P. F. Meas.	Exp.	Group No.		Mfg.
9		9	23	6	1	0	16
9			640	9	1	0	21
9			300	9	1	0	22
9			100	9	1	0	23
9			760	9	1	0	24
14		9	40	6	1	0	16
14			150	9	1	0	21
14			600	9	1	0	22
14			620	9	1	0	23
14			660	9	1	0	24
15		9	10	6	1	0	16
15			500	9	1	0	21
15			250	9	1	0	22
15			280	9	1	0	23
15			440	9	1	0	24
19		9	15	6	1	0	16
19			350	9	1	0	21
19			150	9	1	0	22
19				9	1	0	23
19			540	9	1	0	24
21		9	11	6	1	0	16
21			250	9	1	0	21
21			200	9	1	0	22
21			250	9	1	0	23
21			960	9	1	0	24
23	10	9	140	6	1	0	16
23			380	9	1	0	21
23			100	9	1	0	22
23			500	9	1	0	23
23			860	9	1	0	24
25		9	26	6	1	0	16

25			250	9	1	0	21
25			200	9	1	0	22
25			220	9	1	0	23
25			100	9	1	0	24
27		9	270	6	1	0	16
27			520	9	3	0	21
27			80	9	3	0	22
27			760	9	3	0	23
27			1400	9	3	0	24
33	100	9	260	6	1	0	16
33			150	9	5	0	21
33			300	9	5	0	22
33				9	5	0	23
33			160	9	5	0	24
38		9	24	6	1	0	16
38			1000	9	2	0	21
38			420	9	2	0	22
38			600	9	2	0	23
38			1300	9	2	0	24
42		9	16	6	1	0	16
42			400	9	4	0	21
42			420	9	4	0	22
42			180	9	4	0	23
42			CF	9	4	0	24
44		9	110	6	1	0	16
44			500	9	4	0	21
44			110	9	4	0	22
44			360	9	4	0	23
44			1400	9	4	0	24
57	500	9	23	3	2	0	16
57			170	9	1	0	21
57			150	9	1	0	22
57			20	9	1	0	23
57			160	9	1	0	24
94		9	450	6	2	0	16
94			30	9	4	0	21
94			900	9	4	0	22

94			940	9	4	0	23
94			640	9	4	0	24
95		9	21	6	2	0	16
95			110	9	4	0	21
95			100	9	4	0	22
95			280	9	4	0	23
95			920	9	4	0	24
98		9	16	6	2	0	16
98			1	9	6	0	21
98			220	9	6	0	22
98			660	9	6	0	23
98			300	9	6	0	24
1	360	9	470	6	1	1	16
1			200	9	1	1	21
1			670	9	1	1	22
1			300	9	1	1	23
1			220	9	1	1	24
7	12	6	3	9	1	1	21
7			90	9	1	1	22
7			80	9	1	1	23
7			820	9	1	1	24
22	12	6	3	9	1	1	21
22			100	9	1	1	22
22			140	9	1	1	23
22			960	9	1	1	24
43			7300	9	1	1	16
43			1	9	4	1	21
43			10	9	4	1	22
43			280	9	4	1	23
43			420	9	4	1	24
49	1300	6		9	1	1	14
49			CF	9	1	1	15
49			CF	9	1	1	16
49			CF	9	6	1	21
49			CF	9	6	1	22
49			CF	9	6	1	23
49			CF	9	6	1	24

5	250	9	860	6	1	2	16
5			30	9	1	2	21
5			370	9	1	2	22
5			380	9	1	2	23
5			560	9	1	2	24
13	55	6	40	9	1	2	21
13			360	9	1	2	22
13			380	9	1	2	23
13			520	9	1	2	24
15	250	9	260	6	1	2	16
15			170	9	1	2	21
15			200	9	1	2	22
15			180	9	1	2	23
15			540	9	1	2	24
18	140	6	3	9	1	2	21
18			200	9	1	2	22
18			320	9	1	2	23
18			660	9	1	2	24
20	220	6	3	9	1	2	21
20			250	9	1	2	22
20			520	9	1	2	23
20			460	9	1	2	24
23	300	6	190	9	1	2	21
23			200	9	1	2	22
23			360	9	1	2	23
23			440	9	1	2	24
31	100	6	35	9	5	2	21
31			230	9	5	2	22
31			80	9	5	2	23
31			480	9	5	2	24
33	300	9	1300	6	1	2	16
33			100	9	5	2	21
33			200	9	5	2	22
33			120	9	5	2	23
33			360	9	5	2	24

34	300	9	1000	6	1	2	16
34			120	9	5	2	21
34			230	9	5	2	22
34			320	9	5	2	23
34			160	9	5	2	24
35	150	9	160	6	1	2	16
35			3	9	5	2	21
35			150	9	5	2	22
35			100	9	5	2	23
35			220	9	5	2	24
39	150	9	170	6	1	2	16
39			360	9	2	2	21
39			370	9	2	2	22
39			380	9	2	2	23
39			960	9	2	2	24
45	200	9	440	6	1	2	16
45			3	9	4	2	21
45			40	9	4	2	22
45			380	9	4	2	23
45			380	9	4	2	24
46	300	9	10	3	1	2	16
46			1000	9	6	2	21
46			430	9	6	2	22
46			460	9	6	2	23
46			840	9	6	2	24
49	250	9	350	6	1	2	16
49			450	9	6	2	21
49			390	9	6	2	22
49			400	9	6	2	23
49			760	9	6	2	24
50	250	9	3000	6	1	2	16
50			180	9	6	2	21
50			260	9	6	2	22
50			550	9	6	2	23
50			540	9	6	2	24
53	150	9	600	6	2	2	16
53			210	9	1	2	21

53			220	9	1	2	22
53			900	9	1	2	23
53			380	9	1	2	24
56	150	9	220	6	2	2	16
56			170	9	1	2	21
56			230	9	1	2	22
56			180	9	1	2	23
56			400	9	1	2	24
61	120	6	50	9	1	2	21
61			140	9	1	2	22
61			70	9	1	2	23
61			560	9	1	2	24
62	250	9	460	6	2	2	16
62			170	9	1	2	21
62			150	9	1	2	22
62			240	9	1	2	23
62			620	9	1	2	24
71	50	9	300	6	2	2	16
71			210	9	1	2	21
71			230	9	1	2	22
71			240	9	1	2	23
71			620	9	1	2	24
79	130	9	310	6	2	2	16
79			160	9	3	2	21
79			320	9	3	2	22
79			420	9	3	2	23
79			820	9	3	2	24
2	24	6	62	3	1	3	16
2			60	6	1	3	21
2			22	6	1	3	22
2			15	6	1	3	23
2			19	6	1	3	24
16	18	6	12	3	1	3	16
16			120	6	1	3	21
16			220	6	1	3	22
16			18	6	1	3	23
16			12	6	1	3	24

18	25	6	24	3	1	3	16
18			15	6	1	3	21
18			24	6	1	3	22
18			27	6	1	3	23
18			20	6	1	3	24
29	36	6	230	3	1	3	16
29			53	9	3	3	21
29			2	3	3	3	22
29			110	6	3	3	23
29			18	6	3	3	24
30	24	6	12	9	3	3	21
30			30	6	3	3	22
30			26	6	3	3	23
30			21	6	3	3	24
31	22	6	750	3	1	3	16
31			J	9	5	3	21
31			J	9	5	3	22
31			CF	9	5	3	23
31			CF	9	5	3	24
37	300	6	7	9	2	3	21
37			21	6	2	3	22
37			30	6	2	3	23
37			41	6	2	3	24
45	34	6	74	3	1	3	16
45			1000	6	4	3	21
45			38	6	4	3	22
45			8	6	4	3	23
45			CF	6	4	3	24
46	20	6	100	3	1	3	16
46			23	6	6	3	21
46			24	6	6	3	22
46			26	6	6	3	23
46			48	6	6	3	24
47	190	6	78	3	1	3	16
47			J	6	6	3	21
47			CF	6	6	3	22
47			CF	6	6	3	23

47			CF	6	6	3	24
48	8	9	13	6	6	3	23
48			9000	9	6	3	24
49	26	6	78	3	1	3	16
49			3000	6	6	3	21
49			1400	6	6	3	22
49			1800	6	6	3	23
49			CF	9	6	3	24
54	46	6	720	3	2	3	16
54			120	6	1	3	21
54			140	6	1	3	22
54			30	6	1	3	23
54			43	6	1	3	24
66	12	6	120	3	1	3	24
77	49	6	43	9	3	3	23
77			31	6	3	3	24
78	29	6	24	3	2	3	16
78			250	6	3	3	21
78			160	6	3	3	22
78			100	6	3	3	23
78			86	6	3	3	24
98	480	6	52	3	2	3	16
98			J	6	6	3	21
98			CF	6	6	3	22
98			CF	6	6	3	23
98			CF	6	6	3	24
100	70	6	105	3	2	3	16
100			CF	6	6	3	21
100			CF	6	6	3	22
100			CF	6	6	3	23
100			CF	9	6	3	24
129	66	6	67	3	1	3	22

129			42	3	1	3	23
129			CF	6	1	3	24
131	65	6	32	3	1	3	22
131			J		1	3	23
131			CF	6	1	3	24
134	200	6	140	3	1	3	21
134			15	3	1	3	22
134			J		1	3	23
134			CF	6	1	3	24
152	11	6	8	9	5	3	22
152			6400	9	5	3	23
152			5800	9	5	3	24
68	80	9	84	6	1	4	24
45	3	9	17	6	4	4	24
50	9	9	26	6	6	4	23
50			240	6	6	4	24
163	220	9	570	6	4	4	22
163			23	6	4	4	23
163			20	6	4	4	24
4	1500	9	220	3	1	5	16
4			1050	9	1	5	21
4			1400	9	1	5	22
4			6100	9	1	5	23
4			1800	9	1	5	24
17	360	6	160	9	1	5	21
17			760	9	1	5	22
17			600	9	1	5	23
17			1300	9	1	5	24
21	2500	6	35	3	1	5	22

21			J		1	5	23
21			CF	9	1	5	24
23	3200	6	1900	3	1	5	22
23			J		1	5	23
23			CF	9	1	5	24
27	700	9	6000	3	1	5	12
27			J		1	5	13
27			9700	6	1	5	14
27			CF	9	1	5	15
27			CF	6	1	5	16
27			CF		3	5	21
27			CF	9	3	5	22
27			CF	9	3	5	23
27			CF	9	3	5	24
29	700	9	840	6	3	5	23
29			CF	9	3	5	24
44	1000	9	480	3	1	5	16
44			8200	6	4	5	21
44			CF	9	4	5	22
44			CF	9	4	5	23
44			CF	9	4	5	24
50	1600	9	600	3	1	5	16
50			1300	9	6	5	21
50			1650	9	6	5	22
50			2600	9	6	5	23
50			3600	9	6	5	24
51	1800	9	22	3	2	5	16
51			3	9	1	5	21
51			2150	9	1	5	22
51			2500	9	1	5	23
51			2500	9	1	5	24
54	460	6	24	3	1	5	21
54			11	3	1	5	22
54			J		1	5	23
54			CF	9	1	5	24

56	1400	9	1650	6	2	5	16
56			CF	3	1	5	21
56			CF	3	1	5	22
56			CF	9	1	5	23
56			CF	9	1	5	24
57	1500	9	4000	6	2	5	16
57			CF	3	1	5	21
57			CF	3	1	5	22
57			CF	9	1	5	23
57			CF	9	1	5	24
58	1500	9	230	3	2	5	16
58			4500	9	1	5	21
58			340	9	1	5	22
58			1000	9	1	5	23
58			1200	9	1	5	24
60	1600	9	2300	3	2	5	16
60			CF	9	1	5	21
60			CF	9	1	5	22
60			CF	9	1	5	23
60			CF	9	1	5	24
62	1600	9	110	3	2	5	16
62			36	3	1	5	21
62			17	3	1	5	22
62			J		1	5	23
62			CF	9	1	5	24
64	900	9	120	3	2	5	16
64			CF	3	1	5	21
64			CF	3	1	5	22
64			CF	9	1	5	23
64			CF	9	1	5	24
66	1600	9	600	3	2	5	16
66			CF	9	1	5	21
66			CF	9	1	5	22
66			CF	9	1	5	23
66			CF	9	1	5	24
69	800	6	560	9	1	5	21
69			450	9	1	5	22

69			2000	9	1	5	23
69			1300	9	1	5	24
74	1700	9	480	3	2	5	16
76	930	9	1100	6	3	5	23
76			1000	9	3	5	24
77	1600	9	3600	6	2	5	16
77			CF	9	3	5	21
77			CF	9	3	5	22
77			CF	6	3	5	23
77			CF	9	3	5	24
91	1200	9	9600	6	4	5	22
91			CF		4	5	23
91			CF	9	4	5	24
93	1300	9	8400	6	4	5	22
93			CF		4	5	23
93			CF	9	4	5	24
94	1400	9	5500	6	2	5	16
94			J	9	4	5	21
94			CF	6	4	5	22
94			CF	9	4	5	23
94			CF	9	4	5	24
159	1250	9	1300	6	2	5	23
159			2000	9	2	5	24
1	400	9	240	3	1	6	16
1			3	9	1	6	21
1			660	9	1	6	22
1			CF		1	6	23
1			CF	9	1	6	24
4	380	9	650	3	1	6	16
4			1400	9	1	6	21
4			4	9	1	6	22

4			50	9	1	6	23
4			360	9	1	6	24
21	250	9	13	3	1	6	16
21			3	9	1	6	21
21			4300	9	1	6	22
21			900	9	1	6	23
21			15	6	1	6	24
24	500	9	5	3	1	6	16
24			400	9	1	6	21
24			320	9	1	6	22
24				9	1	6	23
24			2000	9	1	6	24
25	600	9	620	6	1	6	16
25			600	9	1	6	21
25				9	1	6	22
25			700	9	1	6	23
25			1000	9	1	6	24
35	950	6	3	9	5	6	21
35			2050	9	5	6	22
35			1100	9	5	6	23
35			500	9	5	6	24
58	150	9	40	3	2	6	16
58			73	6	1	6	21
58			74	6	1	6	22
58			40	6	1	6	23
58			31	6	1	6	24
78	400	9	480	6	2	6	16
78			600	9	3	6	21
78			900	9	3	6	22
78			550	9	3	6	23
78			420	9	3	6	24
95	450	9	3900	6	2	6	16
95			1000	9	4	6	21
95			420	9	4	6	22
95			460	9	4	6	23
95			340	9	4	6	24

2	2	9	390	6	1	8	23
2			4300	9	1	8	24
27	3000	9	3800	6	1	8	12
27			J	9	1	8	15
27			CF	9	3	8	21
27			CF	6	3	8	22
27			CF	9	3	8	23
27			CF	9	3	8	24
36	4200	9	6000	3	1	8	12
36			J	9	1	8	15
36			54	3	1	8	16
36			CF	9	2	8	21
36			CF		2	8	22
36			CF	9	2	8	23
36			CF	9	2	8	24
57	2900	9	17	3	1	8	23
57			CF	9	1	8	24
5	8200	9	38	3	1	9	16
5			31	6	1	9	21
5			23	3	1	9	22
5			23	3	1	9	23
5			4700	9	1	9	24
16	390	6	75	9	1	9	21
16			1150	9	1	9	22
16			1600	9	1	9	23
16			1900	9	1	9	24
21	5200	9	7700	6	1	9	16
21			56	6	1	9	21
21			660	6	1	9	22
21			17	6	1	9	23
21			5400	9	1	9	24
22	1100	9	2500	6	1	9	16
22			790	6	1	9	21
22			580	6	1	9	22
22			490	6	1	9	23
22			CF	9	1	9	24

24	10	6	37	3	1	9	16
24			19	6	1	9	21
24			14	6	1	9	22
24			6200	9	1	9	23
24			4800	9	1	9	24
26	4000	9	800	3	1	9	16
26			27	6	3	9	21
26			27	6	3	9	22
26			29	6	3	9	23
26			9400	9	3	9	24
27	4900	6	12	9	3	9	21
27			110	9	3	9	22
27			160	9	3	9	23
27			21	6	3	9	24
28	16	6	14	3	1	9	16
28			3800	6	3	9	21
28			17	3	3	9	22
28			16	3	3	9	23
28			82	6	3	9	24
35	15	6	8	9	5	9	22
35			22	6	5	9	23
35			16	6	5	9	24
37	2700	9	3000	6	1	9	16
37			7800	9	2	9	21
37			16	6	2	9	22
37			20	6	2	9	23
37			38	6	2	9	24
39	5000	9	21	3	1	9	16
39			11	6	2	9	21
39			24	6	2	9	22
39			19	6	2	9	23
39			21	6	2	9	24
40	17	6	33	3	1	9	16
40			70	6	2	9	21
40			150	6	2	9	22
40			170	6	2	9	23
40			160	6	2	9	24

41	30	6	16	3	1	9	16
41			1750	9	4	9	21
41			1800	9	4	9	22
41			2400	9	4	9	23
41			2400	9	4	9	24
48	5400	9	340	3	1	9	16
48			4600	9	6	9	21
48			7200	9	6	9	22
48			1500	9	6	9	23
48			1800	9	6	9	24
60	9600	9	40	3	2	9	16
60			860	6	1	9	21
60			200	6	1	9	22
60			210	6	1	9	23
60			100	6	1	9	24
61	5200	9	6700	6	2	9	16
61			110	6	1	9	21
61			23	6	1	9	22
61			68	6	1	9	23
61			7200	9	1	9	24
63	3800	9	4700	6	2	9	16
63			1800	9	1	9	21
63			3100	9	1	9	22
63			3700	9	1	9	23
63			2800	9	1	9	24
64	6800	9	13	3	2	9	16
64			14	3	1	9	21
64			320	6	1	9	22
64			330	6	1	9	23
64			14	6	1	9	24
68	230	6	12	9	1	9	21
68			13	6	1	9	22
68			13	6	1	9	23
68			11	6	1	9	24
71	18	6	130	3	2	9	16
71			130	6	1	9	21
71			43	6	1	9	22

71			25	6	1	9	23
71			1000	9	1	9	24
78	4500	9	190	3	2	9	16
78			27	6	3	9	21
78			83	6	3	9	22
78			85	6	3	9	23
78			52	6	3	9	24
82	2600	9	2700	6	5	9	24
83	2600	9	3000	6	5	9	24
90	4400	9	4600	6	2	9	16
90			5400	9	2	9	21
90			2700	9	2	9	22
90			1700	9	2	9	23
90			3400	9	2	9	24
168	15	6	5	9	6	9	22
168			1400	9	6	9	23
168			6100	9	6	9	24

APPENDIX III
COMPUTED STATISTICS SHEETS

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
AEROVOX CAPACITORS - MC605104RK

Parameter: Capacitance
Nominal Value: (100.)
Upper Limit: (110.)

Unit: Nanofarads
Lower Limit: (90.0)

GROUPS: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
88.2	98.221	106.0	4.0488	-	-	-	-	-	-	-	170	-	0	3	0	0

CORRUGATED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Capacitance
Nominal Value: (100.)
Upper Limit: (110.)

Unit: Nanofarads
Lower Limit: (90.0)

GROUPS: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
86.9	92.501	99.70	2.5711	-	-	-	-	-	-	-	170	-	0	26	0	0

JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CK16M104K

Parameter: Capacitance
Nominal Value: (100.)
Upper Limit: (110.)

Unit: Nanofarads
Lower Limit: (90.0)

GROUPS: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
74.6	91.783	100.8	4.2964	-	-	-	-	-	-	-	167	-	0	43	3	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Capacitance
Nominal Value: (1.0)
Upper Limit: (1.1)

Unit: Microfarads
Lower Limit: (0.9)

GROUPS: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
.868	.96343	1.066	.04207	-	-	-	-	-	-	-	1/0	-	0	6	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
KING ELECTRIC CAPACITORS - KC80BW104K

Parameter: Capacitance
Nominal Value: (100.)
Upper Limit: (110.)

Unit: Nanofarads
Lower Limit: (90.0)

Groups: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
86.1	100.37	116.0	10.411	-	-	-	-	-	-	-	170	-	53*	35*	0	0

*Computed on the basis of ±10 percent tolerance as ordered by JPL. Actual capacitors are ±20 percent.

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
SCIONICS CAPACITORS - SCM30D104K

Parameter: Capacitance
Nominal Value: (100.)
Upper Limit: (110.)

Unit: Nanofarads
Lower Limit: (90.0)

GROUPS: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
88.3	100.06	105.0	2.5060	-	-	-	-	-	-	-	170	-	0	1	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Capacitance
Nominal Value: (100.)
Upper Limit: (110.)

Unit: Nanofarads
Lower Limit: (90.0)

GROUPS: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
89.0	94.086	105.9	2.7233	-	-	-	-	-	-	-	169	-	0	7	1	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Capacitance
Nominal Value: (10.0)
Upper Limit: (11.0)

Unit: Nanofarads
Lower Limit: (9.0)

GROUPS: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
9.00	9.8314	11.00	.35437	-	-	-	-	-	-	-	159	-	0	0	1	10

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VK30XX104K

Parameter: Capacitance
Unit: Nanofarads
GROUPS: I thru V
Nominal Value: (100.)
Lower Limit: (90.0)
Upper Limit: (110.)

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
89.0	96.362	105.0	3.9871	-	-	-	-	-	-	-	170	-	0	3	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
WESTCAP CAPACITORS - B758BX104K

Parameter: Capacitance
Nominal Value: (100.)
Upper Limit: (110.)

Unit: Nanofarads
Lower Limit: (90.0)

GROUPS: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
89.8	89.835	100.0	2.9797	-	-	-	-	-	-	-	170	-	0	92	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
AEROVOX CAPACITORS - MC605104RK

Parameter: Percent Dissipation
Nominal Value: Less than 2.0 percent
Upper Limit: 2.0 Percent

Unit: DF x 100
Lower Limit: None

GROUPS: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.47	.72624	1.45	.20115	-	-	-	-	-	-	-	170	-	0	0	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Percent Dissipation
Unit: DF x 100
GROUPS: I thru V
Nominal Value: Less than 2.0 percent
Lower Limit: None
Upper Limit: 2.0 Percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.44	.51571	0.67	.08905	-	-	-	-	-	-	-	170	-	0	0	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CK16M104K

Parameter: Percent Dissipation
Nominal Value: Less than 2.5 percent
Upper Limit: 2.5 Percent

Unit: DF x 100
Lower Limit: None

GROUPS: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.46	.55645	0.78	.06452	-	-	-	-	-	-	-	166	-	0	0	3	1

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CN05M105K

Parameter: Percent Dissipation
Nominal Value: Less than 2.5 percent
Upper Limit: 2.5 Percent

Unit: DF x 100
Lower Limit: None

GROUPS: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.27	1.5241	1.92	.10491	-	-	-	-	-	-	-	170	-	0	0	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
KING ELECTRIC CAPACITORS - K30BW104K

Parameter: Percent Dissipation Unit: DF x 100 GROUPS: I thru V
Nominal Value: Less than 2.5 percent Lower Limit: None
Upper Limit: 2.5 Percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.47	.55453	1.11	.07591	-	-	-	-	-	-	-	170	-	0	0	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
SCIONICS CAPACITORS - SCM30D104K

Parameter: Percent Dissipation
Nominal Value: Less than 2.5 percent
Upper Limit: 2.5 Percent

Unit: DF x 100
Lower Limit: None

GROUPS: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.42	1.6112	2.82	.19768	-	-	-	-	-	-	-	169	-	0	0	0	1

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
EMC CAPACITORS - EK200R104K

Parameter: Percent Dissipation
Nominal Value: Less than 2.5 percent
Upper Limit: 2.5 Percent

Unit: DF x 100
Lower Limit: None

GROUPS: I thru V

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.46	.51793	0.66	.07172	-	-	-	-	-	-	-	169	-	0	0	1	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 1.52.20-02
VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Percent Dissipation
Unit: DF x 100
GROUPS: I thru V
Nominal Value: Less than 2.5 percent
Lower Limit: None
Upper Limit: 2.5 Percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.25	1.4986	2.09	.07019	-	-	-	-	-	-	-	160	-	0	0	1	9

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VK30BX104K

Parameter: Percent Dissipation
Unit: DF x 100
GROUPS: I thru V
Nominal Value: Less than 3.0 percent
Lower Limit: None
Upper Limit: 3.0 Percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement:										
1.28	1.5347	2.35	.20411	-	-	-	-	-	-	-	170	-	0	0	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
WESTCAP CAPACITORS - B75BBX104K

Parameter: Percent Dissipation
Unit: DF x 100
GROUPS: I thru V
Nominal Value: Less than 2.5 percent
Lower Limit: None
Upper Limit: 2.5 Percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.06	.63041	1.76	.20451	-	-	-	-	-	-	-	170	-	0	0	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Insulation Leakage GROUPS: I thru V

Min. (K megohms)	No	Nc
	Initial Measurement	
3. 774	170	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
AEROVOX CAPACITORS - MC605104RK

Parameter: Insulation Leakage GROUPS: I thru V

Min. (K megohms)	No	Nc
	Initial Measurement	
16.667	170	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
GULTON CAPACITORS - CK16M104K

Parameter: Insulation Leakage GROUPS: I thru V

Min. (K megohms)	No	Nc
	Initial Measurement	
38.462	170	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CN05M105K

Parameter: Insulation Leakage GROUPS: I thru V

Min. (K megohms)	No	Nc
	Initial Measurement	
1.111	170	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
KING ELECTRIC CAPACITORS - KC80BW104K

Parameter: Insulation Leakage GROUPS: I thru V

Min. (K megohms)	No	Nc
	Initial Measurement	
5.878	170	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
SCIONICS CAPACITORS - SCM30D104K

Parameter: Insulation Leakage GROUPS: I thru V

Min. (K megohms)	No	Nc
	Initial Measurement	
20. 000	170	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
EMC CAPACITORS - EK200R104K

Parameter: Insulation Leakage

GROUPS: I thru V

Min. (K megohms)	No	Nc
	Initial Measurement	
90. 909	168	2

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Insulation Leakage GROUPS: I thru V

Min. (K megohms)	No	Nc
	Initial Measurement	
16.111	168	2

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VK30BX104K

Parameter: Insulation Leakage GROUPS: I thru V

Min. (K megohms)	No	Nc
	Initial Measurement	
4.165	170	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
WESTCAP CAPACITORS - B758Bx104K

Parameter: Insulation Leakage GROUPS I thru V

Min. (K megohms)	No	Nc
	Initial Measurement	
3.261	170	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
AEROVOX CAPACITORS - MC605104RK

Parameter: Capacitance
Nominal Value: (100.0)
Upper Limit: (110.)
Unit: Nanofarads
Lower Limit: (90.0)
GROUP: I Only

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
91.0	100.1	106.0	3.7408	-	-	-	-	-	-	-	50	-	0	0	0	0
						Post Burn-In Measurement										
94.8	103.2	111.1	4.0600	1.1780	-4.5	+3.1	+9.5	3.3919	+3.137	+6.5459	50	50	0	0	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Capacitance
Unit: Nanofarads
Nominal Value: (100.0)
Lower Limit: (90.0)
Upper Limit: (110.)
GROUP: I Only

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
88.0	93.1	99.0	2.6604	-	-	-	-	-	-	-	50	-	0	7	0	0
						Post Burn-In Measurement										
90.1	94.7	100.8	2.5570	0.9238	+0.8	+1.68	+2.4	0.4278	+1.805	+27.2084	48	48	0	0	2	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CN05M105K

Parameter: Capacitance Unit: Microfarads
Nominal Value: (1.0) Lower Limit: (0.9) GROUP: I Only
Upper Limit: (1.1)

Min	Mean	Max	Std	D	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.890	.968	1.066	.04963	-	-	-	-	-	-	-	50	-	0	2	0	0
						Post Burn-In Measurement										
.909	1.000	1.100	0.05173	1.0861	+0.009	+.030	+.062	0.0092	+3.098	+228.261	49	49	0	0	1	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CK16M104K

Parameter: Capacitance
Unit: Nanofarads
Nominal Value: (100.)
Lower Limit: (90.0)
Upper Limit: (110.)
GROUP: I Only

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
81.0	92.1	100.0	3.7972	-	-	-	-	-	-	-	48	-	0	11	2	0
						Post Burn-In Measurement										
80.9	92.3	100.6	3.7688	0.9852	-1.0	+0.22	+4.1	0.8509	+0.239	+1.9693	48	48	0	10	2	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
KING ELECTRIC CAPACITORS - KC80BW104K

Parameter: Capacitance
Nominal Value: (100.)
Upper Limit: (110.)
Unit: Nanofarads
Lower Limit: (90.)
GROUP: I Only

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
87.0	100.1	116.0	10.099	-	-	-	-	-	-	-	50	-	13*	8*	0	0
						Post Burn-In Measurement										
86.0	100.1	116.4	10.407	1.0619	-2.7	-0.18	+3.8	1.6679	-0.180	-0.7573	49	49	13	12	1	0

*Computed on the basis of ± 10 percent as ordered by JPL. Actual capacitors are ± 20 percent.

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
SCIONICS CAPACITORS - SCM30D104K

Parameter: Capacitance
Nominal Value: (100.)
Upper Limit: (110.)

Unit: Nanofarads
Lower Limit: (90.0)

GROUP I ONLY

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	N1	Nc	Nt
						Initial Measurement										
94.0	102.0	105.0	1.8238	-	-	-	-	-	-	-	50	-	0	0	0	0
						Post Burn-In Measurement										
97.5	104.4	113.1	2.1180	1.1349	+0.4	+2.54	+3.8	1.3065	+2.491	+13.4692	48	48	1	0	2	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
EMC CAPACITORS - EK200R104K

Parameter: Capacitance Unit: Nanofarads
Nominal Value: (100.) Lower Limit: (90.0) GROUP: I Only
Upper Limit: (110.)

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
89.0	94.4	105.0	2.8933	-	-	-	-	-	-	-	50	-	0	1	0	0
						Post Burn-In Measurement										
92.7	97.6	105.7	2.6075	0.8122	+0.5	+3.09	+4.7	1.2116	+3.273	+16.7236	43	43	0	0	7	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Capacitance **Unit:** Nanofarads
Nominal Value: (10.0) **Lower Limit:** (9.0) GROUP: I Only
Upper Limit: (11.0)

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
9.00	9.88	11.00	.38545	-	-	-	-	-	-	-	50	-	0	0	0	0
						Post Burn-In Measurement										
8.69	9.67	10.71	.45807	1.4123	-0.98	-0.208	+0.54	0.3689	-2.105	-3.9692	49	49	0	3	1	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VK30BX104K

Parameter: Capacitance
Nominal Value: (100.)
Upper Limit: (110.)

Unit: Nanofarads
Lower Limit: (90.0)

GROUP: I Only

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
92.0	98.9	105.0	3.8153	-	-	-	-	-	-	-	50	-	0	0	0	0
						Post Burn-In Measurement										
90.5	98.6	104.6	3.9990	1.0987	-8.5	-0.26	+2.4	1.4649	-0.263	-1.2550	50	50	0	0	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
WESTCAP CAPACITORS - B758BX104K

Parameter: Capacitance Unit: Nanofarads
Nominal Value: (100.) Lower Limit: (90.0) GROUP: I only
Upper Limit: (110.)

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
86.0	89.3	93.0	1.7548	-	-	-	-	-	-	-	50	-	0	24	0	0
						Post Burn-In Measurement										
81.9	87.2	94.6	2.8164	2.5762	-4.9	-2.10	+3.8	2.1050	-2.351	-70543	50	50	0	42	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
AEROVOX CAPACITORS - MC605104RK

Parameter: Percent Dissipation Unit: DF x 100
Nominal Value: Less than 2.0 percent Lower Limit: None GROUP: I Only
Upper Limit: 2.0 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.64	0.96	1.45	.19456	-	-	-	-	-	-	-	50	-	0	0	0	0
						Post Burn-In Measurement										
0.66	0.84	1.06	0.09762	0.2518	-0.50	-0.120	+0.12	0.1279	-12.500	-6.6422	50	50	0	-	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152-20-02
CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Percent Dissipation Unit: DF x 100
Nominal Value: Less than 2.0 percent Lower Limit: None GROUP: I Only
Upper Limit: 2.0 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.52	.57540	0.67	0.02961	-	-	-	-	-	-	-	50	-	0	-	0	0
						Post Burn-In Measurement										
0.53	0.62	1.14	0.0866	8.6322	-0.02	+0.038	+0.47	0.07183	+6.609	+3.6267	47	47	0	-	3	0

COMPUTED STATISTICS SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CK16M104K

Parameter: Percent Dissipation Unit: DF x 100
Nominal Value: Less than 2.5 percent Lower Limit: None GROUP: I Only
Upper Limit: 2.5 percent

Min	Mean	Max	Std	F	MinD	MeanD	Max	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.55	0.64250	0.78	.04502	-	-	-	-	-	-	-	48	-	0	-	2	0
						Post Burn-In Measurement										
0.53	0.60	0.72	0.0387	0.7426	-0.11	-0.041	+0.05	0.0383	-6.386	-7.4088	48	48	0	-	2	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS -CN05M105K

Parameter: Percent Dissipation Unit: DF x 100
Nominal Value: Less than 2.5 percent Lower Limit: None GROUPL: I Only
Upper Limit: 2.5 percent

Min	Mean	Max	Std	F	MinD	Mean	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.48	1.6364	1.92	.08545	-	-	-	-	-	-	-	50	-	0	-	0	0
						Post Burn-In Measurement										
1.46	1.58	1.76	0.0795	0.8658	-0.15	+0.054	+0.05	0.0605	-3.301	-6.1769	48	48	0	-	2	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
KING ELECTRIC CAPACITORS - KC80BW104K

Parameter: Percent Dissipation Unit: DF x 100
Nominal Value: Less than 2.5 percent Lower Limit: None GROUP: I Only
Upper Limit: 2.5 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.53	.64240	1.11	.08969	-	-	-	-	-	-	-	50	-	0	-	0	0
						Post Burn-In Measurement										
0.46	0.59	0.72	.04254	0.2524	-0.39	-0.053	+0.03	0.06671	-8.255	-5.561	49	49	0	-	1	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
SCIONICS CAPACITORS - SCM30D104K

Parameter: Percent Dissipation Unit: DF x 100
Nominal Value: Less than 2.5 percent Lower Limit: None GROUP: I Only
Upper Limit: 2.5 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.55	2.0294	9.40	1.0768	-	-	-	-	-	-	-	50	-	1	-	0	0
						Post Burn-In Measurement										
1.70	1.88	2.73	0.1453	0.01821	-0.82	+0.002	+0.75	0.1833	+0.099	+0.0740	46	46	0	-	4	0

COMPUTED STATISTICS SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
EMC CAPACITORS - EK200R104K

Parameter; Percent Dissipation Unit: DF x 100
Nominal Value: Less than 2.5 percent Lower Limit None GROUP: I Only
Upper Limit: 2.5 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	N1	Nc	Ny
						Initial Measurement										
0.55	.6060	0.66	.02687	-	-	-	-	-	-	-	50	-	0	-	0	0
						Post Burn-In Measurement										
0.58	0.66	0.71	0.0877	10.6861	-0.01	+.052	+0.10	0.0268	+8.581	12:4239	41	41	0		9	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Percent Dissipation Unit: DF x 100
Nominal Value: Less than 2.5 percent Lower Limit: None GROUP: I Only
Upper Limit: 2.5 percent

Min	Mean	Max	$S_{\hat{e}}d$	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.67	1.8554	2.09	.08722	-	-	-	-	-	-	-	50	-	0	-	0	0
						Post Burn-In Measurement										
1.30	1.44	2.90	0.2234	0.5658	-0.65	-0.412	+1.00	0.2309	-22.210	-12.488	49	49	0	-	1	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VK30BX104K

Parameter: Percent Dissipation Unit: DF x 100
Nominal Value: Less than 3.0 percent Lower Limit: None GROUP: I Only
Upper Limit: 3.0 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.43	1.6774	2.35	.22493	-	-	-	-	-	-	-	50	-	0	-	0	0
						Post Burn-In Measurement										
1.46	1.64	1.98	0.1625	0.5220	-0.40	-0.043	+0.19	0.1052	-2.564	-2.8341	48	48	0	-	2	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
WESTCAP CAPACITORS - B758BX104K

Parameter: Percent Dissipation Unit: DF x 100
Nominal Value: Less than 2.5 percent Lower Limit: None GROUP: I Only
Upper Limit: 2.5 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.00	.70380	1.32	.21523	-	-	-	-	-	-	-	50	-	0	-	0	0
						Post Burn-In Measurement										
0.59	0.74	1.05	.10719	0.2481	-0.55	+0.031	+0.64	0.1662	+4.410	+1.3192	50	50	0	-	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
AEROVOX CAPACITORS - NC605104RK

Parameter: Insulation Leakage GROUP: I Only

Min. (K megohms)	No	Nc
	Initial Measurement	
55.556	50	0
	Post Burn-In Measurement	
90.910	50	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Insulation Leakage GROUP: I Only

Min. (K megohms)	No	Nc
	Initial Measurement	
50.000	50	0
	Post Burn-In Measurement	
45.455	48	2

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CK16M104K

Parameter: Insulation Leakage

GROUP: I Only

Min. (K megohms)	No	Nc
	Initial Measurement	
62.500	50	0
	Post Burn-In Measurement	
50.000	50	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.02-20
GULTON CAPACITORS - CN05M105K

Parameter: Insulation Leakage GROUP: I Only

Min. (K megohms)	No	Nc
	Initial Measurement	
1.111	50	0
	Post Burn-In Measurement	
0.1493	47	3

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
KING ELECTRIC CAPACITORS - KC80BW104K

Parameter: Insulation Leakage GROUP: I Only

Min. (K megohms)	No	Nc
	Initial Measurement	
14.706	50	0
	Post Burn-In Measurement	
0.1515	49	1

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
SCIONICS CAPACITORS - SCM30D104K

Parameter: Insulation Leakage GROUP: I Only

Min. (K megohms)	No	Nc
	Initial Measurement	
25.000	50	0
	Post Burn-In Measurement	
9.091	47	3

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Insulation Leakage GROUP: I Only

Min. (K megohms)	No	Nc
	Initial Measurement	
20.000	48	2
	Post Burn-In Measurement	
90.909	48	2

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
EMC CAPACITORS - EK200R104K

Parameter: Insulation Leakage **GROUP:** I Only

Min. (K megohms)	No	Nc
	Initial Measurement	
100.000	50	0
	Post Burn-In Measurement	
64.516	49	1

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VK30BX104K

Parameter: Insulation Leakage GROUP: I Only

Min. (K megohms)	No	Nc
	Initial Measurement	
4.165	50	0
	Post Burn-In Measurement	
7.143	47	3

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
WESTCAP CAPACITORS - B758BX104K

Parameter: Insulation Leakage GROUP: I Only

Min. (K megohms)	No	Nc
	Initial Measurement	
5.000	50	0
	Post Burn-In Measurement	
7.813	50	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
AEROVOX CAPACITORS - MC605104RK

Parameter: Capacitance
Unit: Nanofarads
Nominal Value: (100.)
Lower Limit: (90.0)
Upper Limit: (110.)
GROUPS: I and II

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
							Initial Measurement									
88.2	100.0	111.1	5.2272	-	-	-	-	-	-	-	100		1	2	0	0
							Post Vibration Measurement									
89.9	99.7	107.7	4.2101	0.6487	-4.7	-.335	+3.8	2.6946	-0.335	-1.264	100	100	0	1	0	0
							Post Mechanical Shock Measurement									
88.4	98.4	107.4	4.2570	1.0224	-2.8	-1.158	+0.3	0.8078	-1,162	-14.338	100	100	0	2	0	0
							Post Thermal Shock Measurement									
94.6	103.4	110.6	4.2230	0.9841	+2.3	+4.912	+8.7	1.6010	+4.987	-30.680	100	100	1	0	0	0
							Post Moisture Resistance Measurement									
94.3	103.0	111.7	4.4207	1.0958	-2.6	-0.389	+2.0	1.1893	-0.376	-3.271	100	100	2	0	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CK16M104K

Parameter: Capacitance Unit: Nanofarads
Nominal Value: (100.) Lower Limit: (90.0) GROUPS: I and II
Upper Limit: (110.)

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
78.3	92.3	100.8	3.9664	-	-	-	-	-	-	-	98	-	0	23	2	0
						Post Vibration Measurement										
79.0	92.2	102.1	4.1490	1.0942	-1.6	- 0.08	+1.5	1.0020	-0.087	-0.7863	97	97	0	24	3	0
						Post Mechanical Shock Measurement										
78.8	91.9	101.5	4.1407	0.9960	-1.5	- 0.28	+0.9	0.2739	-0.304	-10.0696	97	97	0	25	3	0
						Post Thermal Shock Measurement										
81.7	94.5	103.5	4.1643	1.0114	+0.3	+2.55	+4.4	0.6716	+2.774	+37.397	97	97	0	7	3	0
						Post Moisture Resistance Measurement										
81.3	94.0	104.0	4.2306	1.0321	-1.7	-0.48	+2.4	0.4538	-0.508	-10.416	97	97	0	10	3	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CN05M105K

Parameter: Capacitance
Nominal Value: (1.0)
Upper Limit: (1.1)
Unit: Microfarads
Lower Limit: (0.9)
GROUPS: I and II

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.873	.982	1.100	0.0492	-	-	-	-	-	-	-	98	-	0	2	2	0
						Post Vibration Measurement										
.904	.992	1.086	0.0470	0.9127	-.021	-0.011	+.034	0.0202	-1.070	-5.335	96	96	0	0	4	0
						Post Mechanical Shock Measurement										
.901	.996	1.088	0.0469	0.9949	-.021	+ 0.003	+.034	0.0129	+0.343	+2.5887	96	96	0	0	4	0
						Post Thermal Shock Measurement										
.882	.991	1.083	0.0472	1.0134	+.012	-0.007	+.012	0.0144	-0.653	-4.4223	96	96	0	2	4	0
						Post Moisture Resistance Measurement										
.896	1.009	1.088	0.04797	1.0348	+.001	+0.018	+.091	0.0135	+1.816	+12.820	94	94	0	1	6	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
KING ELECTRIC CAPACITORS - KC80BW104K

Parameter: Capacitance
Nominal Value: (100.)
Upper Limit: (110.)
Unit: Nanofarads
Lower Limit: (90.0)
GROUPS: I and II

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
86.0	99.7	116.4	10.6022	-	-	-	-	-	-	-	99		29	26	1	0
						Post Vibration Measurement										
82.4	99.7	115.6	10.5953	0.9987	-11.4	+0.01	+9.2	1.6589	+0.010	+0.0600	99	99	30	24	1	0
						Post Mechanical Shock Measurement										
85.8	99.5	115.8	10.5736	0.9959	-10.1	- 0.19	+10.0	1.4619	-0.191	-1.2932	99	99	30	24	1	0
						Post Thermal Shock Measurement										
86.9	100.7	116.3	10.9082	0.0975	+ 0.2	+1.19	+ 2.5	0.5604	+1.196	+21.1300	99	99	31	18	1	0
						Post Moisture Resistance Measurement										
86.9	101.1	117.5	10.5749	1.0252	- 1.0	+0.33	+ 1.6	0.6489	+0.328	+5.0348	98	98	31	15	2	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
SCIONICS CAPACITORS - SCM30D104K

Parameter: Capacitance Unit: Nanofarads
Nominal Value: (100.) Lower Limit: (90.0) GROUPS: I and II
Upper Limit: (110.)

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
88.3	101.7	113.1	3.5157	-	-	-	-	-	-	-	97	-	1	1	3	0
						Post Vibration Measurement										
89.9	101.8	105.4	2.2374	0.40502	-2.7	+0.25	+2.8	1.8636	+0.2458	+1.0118	91	91	0	1	7	2
						Post Mechanical Shock Measurement										
89.2	101.1	104.7	2.3847	1.1360	-2.6	-0.75	+0.9	0.5394	-0.737	-13.4078	93	91	0	1	7	0
						Post Thermal Shock Measurement										
90.8	103.1	101.7	2.2410	0.8831	-1.6	+1.95	+4.0	1.5323	+1.929	+12.2725	93	93	0	0	7	0
						Post Moisture Resistance Measurement										
92.6	103.5	109.2	2.8431	1.6095	-3.1	+0.51	+5.5	1.3715	+0.495	+3.5081	89	89	0	0	11	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
EMC CAPACITORS - EK200R104K

Parameter: Capacitance
Unit: Nanofarads
Nominal Value: (100.)
Upper Limit: (110.)
Lower Limit: (90.)
GROUPS: I and II

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Ni	Nc	Nt
						Initial Measurement										
90.0	95.4	105.7	3.0661	-	-	-	-	-	-	-	92	-	0	0	8	0
						Post Vibration Measurement										
90.8	95.2	104.1	2.4739	0.6510	-2.6	-0.15	+1.9	-1.3748	-0.157	-1.0118	86	86	0	0	14	0
						Post Mechanical Shock Measurement										
90.7	94.7	103.6	2.4376	0.9709	-0.8	-0.39	+0.4	-0.2049	-0.410	-17.5448	85	85	0	0	15	0
						Post Thermal Shock Measurement										
92.3	96.8	105.5	2.3573	0.9352	+1.3	+2.07	+3.5	0.5496	+2.185	+34.317	83	83	0	0	17	0
						Post Moisture Resistance Measurement										
92.3	97.3	105.4	2.3879	1.0261	-0.2	+0.46	+1.2	0.3715	+0.475	+11.213	82	82	0	0	18	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Capacitance Unit: Nanofarads
Nominal Value: (10.0) Lower Limit: (9.0) GROUPS: I and II
Upper Limit: (11.0)

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PG	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
8.69	9.72	10.71	0.3931	-	-	-	-	-	-	-	93	-	0	3	1	0
						Post Vibration Measurement										
8.83	9.77	10.72	0.4613	1.3770	-0.16	+0.03	+0.20	0.1052	+0.319	+2.7164	85	85	0	1	15	0
						Post Mechanical Shock Measurement										
8.85	9.75	10.68	0.3657	0.6286	-0.09	-0.03	+0.04	0.0351	-0.266	-6.7540	83	83	0	1	17	0
						Post Thermal Shock Measurement										
8.98	9.92	10.83	0.3409	0.8688	+0.02	+0.16	+0.35	0.0899	+1.651	+16.308	83	83	0	1	17	0
						Post Moisture Resistance Measurement										
9.31	10.06	10.87	0.3377	0.9815	-0.05	+0.14	+1.17	0.2129	+1.371	+5.918	81	71	0	0	19	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VK30BX104K

Parameter: Capacitance Unit: Nanofarads
Nominal Value: (100.) Lower Limit: (90.0) GROUPS: I and II
Upper Limit: (110.)

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
89.0	97.4	104.6	4.0876	-	-	-	-	-	-	-	100	-	0	1	0	0
						Post Vibration Measurement										
89.3	97.3	105.8	3.8681	0.8955	-2.7	-0.07	+1.9	1.1602	-0.072	-0.6003	99	99	0	1	1	0
						Post Mechanical Shock Measurement										
89.1	96.7	104.9	3.8471	0.9892	-9.2	-0.62	+7.1	1.2373	-0.637	-4.9857	99	99	0	1	1	0
						Post Thermal Shock Measurement										
89.1	98.0	106.5	4.0120	1.0876	-7.0	+1.27	+9.6	1.8336	+1.313	+6.926	99	99	0	1	1	0
						Post Moisture Resistance Measurement										
88.8	98.3	107.2	3.9660	0.9772	-7.0	+0.37	+4.2	1.3390	+0.377	+2.749	99	99	0	3	1	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
WESTCAP CAPACITORS -B758BX104K

Parameter: Capacitance Unit: Nanofarads
Nominal Value: (100.) Lower Limit: (90.0) GROUPS: I and II
Upper Limit: (110.)

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
81.9	88.1	96.9	2.8759	-	-	-	-	-	-	-	97	-	0	74	3	0
						Post Vibration Measurement										
80.9	88.0	97.6	3.5774	1.5473	-4.3	-0.12	+8.5	1.5120	-0.136	-0.7736	95	95	0	56	3	2
						Post Mechanical Shock Measurement										
80.4	87.4	97.0	3.3192	0.8608	-1.7	-0.51	+1.3	0.4450	-0.580	-11.2882	97	95	0	77	3	0
						Post Thermal Shock Measurment										
82.0	89.1	102.1	4.0830	1.5132	-2.5	+1.67	+6.8	1.8287	+1.910	+8.994	97	97	0	64	3	0
						Post Moisture Resistance Measurement										
86.8	95.7	109.0	5.6070	1.8858	-4.5	+4.27	+13.7	4.8239	+4.791	+5.457	38	38	0	5	62	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
AEROVOX CAPACITORS - MC605104RK

Parameter: Percent Dissipation Unit: DF x 100
Nominal Value: Less than 2.0 percent Lower Limit: None GROUPS: I and II
Upper Limit: 2.0 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	S_tdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.50	0.75	1.06	0.1348	-	-	-	-	-	-	-	100	-	0	-	0	0
						Post Vibration Measurement										
0.50	0.81	1.27	0.1615	1.4356	-0.30	+0.06	+0.44	0.1036	+8.284	+5.983	100	100	0	-	0	0
						Post Mechanical Shock Measurement										
0.52	0.73	0.97	0.0972	0.3621	-0.36	-0.08	+0.22	0.0542	-9.93	-14.754	100	100	0	-	0	0
						Post Thermal Shock Measurement										
0.70	0.86	1.12	0.0957	0.9693	-0.03	+0.13	+0.40	0.1251	+17.78	+10.343	100	100	0	-	0	0
						Post Moisture Resistance Measurement										
0.63	0.84	1.51	0.1363	2.2095	-0.21	-0.15	+0.49	0.0978	-17.036	-14.932	100	100	0	-	0	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Percent Dissipation Unit: DF x 100
Nominal Value: Less than 2.0 percent Lower Limit: None GROUPS: I and II
Upper Limit: 2.0 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ng	Nu	Nl	Nc	Nt
						Initial Measurement										
0.46	0.55	1.14	0.0853	-	-	-	-	-	-	-	97	-	0	-	3	0
						Post Vibration Measurement										
0.50	0.56	0.87	0.0455	0.2847	-0.70	-0.01	+0.35	0.1060	-1.44	-0.7122	89	89	0	-	11	0
						Post Mechanical Shock Measurement										
0.48	0.54	0.77	0.0398	0.7633	-0.35	-0.02	+0.13	0.0625	-3.94	-3.3192	89	89	0	-	11	0
						Post Thermal Shock Measurement										
0.54	0.60	0.65	0.0212	0.2848	-0.16	+0.06	+0.12	0.0363	+11.567	+15.825	86	86	0	-	14	0
						Post Moisture Resistance Measurement										
0.54	0.60	0.76	0.0406	3.6667	-0.09	+0.06	+0.17	0.0412	+1.006	+13.426	85	85	0	-	15	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CK16M104K

Parameter: Percent Dissipation Unit: DF x 100
Nominal Value: Less than 2.5 percent Lower Limit: None GROUPS: I and II
Upper Limit: 2.5 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.47	0.56	0.72	0.0754	-	-	-	-	-	-	-	98	-	0	-	2	0
						Post Vibration Measurement										
0.50	0.60	0.79	0.0523	0.4798	-0.11	+0.03	+0.16	0.0753	+5.72	+4.1855	97	97	0	-	3	0
						Post Mechanical Shock Measurement										
0.49	0.56	0.72	0.0325	0.3883	-0.12	-0.03	+0.06	0.0400	-5.70	-8.3715	97	97	0	-	3	0
						Post Thermal Shock Measurement										
0.56	0.64	0.82	0.0342	1.1038	+0.01	+0.08	+0.20	0.0281	+13.352	+26.281	97	97	0	-	3	0
						Post Moisture Resistance Measurement										
0.56	0.73	1.32	0.1331	15.1368	-0.13	+0.09	+0.58	0.1278	+14.420	+6.945	93	93	0	-	7	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CN05M105K

Parameter: Percent Dissipation
Nominal Value: Less than 2.5 percent
Upper Limit: 2.5 percent
Unit: DF x 100
Lower Limit: None
GROUPS: I and II

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.36	1.53	1.76	0.0873	-	-	-	-	-	-	-	97	-	0	-	3	0
						Post Vibration Measurement										
1.46	1.70	1.94	0.1131	1.6798	-0.15	+0.17	+0.45	0.1498	+11.053	+11.0563	96	96	0	-	4	0
						Post Mechanical Shock Measurement										
1.45	1.61	1.79	0.0858	0.5750	-0.27	-0.09	+0.06	0.0713	-5.47	-12.7720	96	96	0	-	4	0
						Post Thermal Shock Measurement										
1.32	1.55	2.32	0.1053	1.505	-0.30	-0.25	+0.09	1.8708	-15.691	+1.3198	96	96	0	-	4	0
						Post Moisture Resistance Measurement										
1.48	1.79	2.63	0.2644	6.3087	-0.02	+0.24	+1.10	0.2710	+15.711	+8.588	91	91	0	-	9	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Percent Dissipation — **Unit:** DF x 100
Nominal Value: Less than 2.5 percent — **Lower Limit:** None — **GROUPS:** I and II
Upper Limit: 2.5 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.46	0.55	0.72	0.0502	-	-	-	-	-	-	-	98	-	0	-	1	1
						Post Vibration Measurement										
0.48	0.58	0.68	0.0427	0.7222	-0.10	+0.03	+0.13	0.0638	+5.244	+4.5229	99	98	0	-	1	0
						Post Mechanical Shock Measurement										
0.48	0.56	0.67	0.0324	0.5769	-0.10	-0.02	+0.02	0.0257	-3.436	-7.7461	99	99	0	-	1	0
						Post Thermal Shock Measurement										
0.52	1.63	0.70	0.05459	2.8381	-0.02	+0.02	+0.11	0.2862	+4.099	+0.7751	99	99	0	-	1	0
						Post Moisture Resistance Measurement										
0.53	0.64	0.86	0.0549	1.0101	-.08	+0.04	+0.11	0.0463	+2.531	+8.499	92	92	0	-	8	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
SCIONICS CAPACITORS - SCM30D104K

Parameter: Percent Dissipation
Nominal Value: Less than 2.5 percent
Upper Limit: 2.5 percent
Unit: DF x 100
Lower Limit: None
GROUPS I and II

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.42	1.69	2.73	0.3970	-	-	-	-	-	-	-	95	-	0	-	5	0
						Post Vibration Measurement										
1.52	1.73	2.43	0.1206	0.0923	-0.33	+0.03	+0.41	0.2537	+3.669	+2.3318	91	91	0	-	7	2
						Post Mechanical Shock Measurement										
1.39	1.58	1.75	0.0768	0.4058	-0.83	-0.16	+0.02	0.0962	-9.054	-15.7339	93	91	0	-	7	0
						Post Thermal Shock Measurement										
1.48	1.64	1.74	0.1030	1.7983	-2.65	+0.05	+0.18	0.3811	+3.105	+1.247	93	93	0	-	7	0
						Post Moisture Resistance Measurement										
1.68	2.15	3.00	0.2922	8.0471	+0.04	+0.51	+1.44	0.4062	+31.341	+10.436	68	68	0	-	32	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
EMC CAPACITORS - EK200R104K

Parameter: Percent Dissipation
Nominal Value: Less than 2.5 percent
Upper Limit: 2.5 percent
Unit: DS x 100
Lower Limit: None
GROUPS: I and II

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.46	0.56	1.47	0.1251	-	-	-	-	-	-	-	91	-	0	-	9	0
						Post Vibration Measurement										
0.50	0.56	0.62	0.0255	0.0415	-1.41	+0.00	+1.3	0.0970	+0.534	+0.2851	85	85	0	-	15	0
						Post Mechanical Shock Measurement										
0.48	0.53	0.68	0.0274	1.1539	-0.09	-0.02	+0.11	0.0377	-4.144	-5.6272	85	85	0	-	15	0
						Post Thermal Shock Measurement										
0.53	0.57	0.72	0.0249	0.8267	-0.09	+0.03	+0.19	0.0372	+6.403	+9.747	83	83	0	-	17	0
						Post Moisture Resistance Measurement										
0.55	0.64	1.18	0.0943	14.3548	-0.09	+0.07	+0.19	0.0885	+12.389	+7.115	81	81	0	-	19	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Percent Dissipation — Unit: DF x 100
Nominal Value: Less than 2.5 percent — Lower Limit: None — GROUPS: I and II
Upper Limit: 2.5 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.30	1.39	2.90	0.1710	-	-	-	-	-	-	-	92	-	0	-	1	7
						Post Vibration Measurement										
1.20	1.39	1.53	0.0908	0.2721	-1.65	-0.10	+0.19	0.2194	-6.892	-3.9870	83	83	0	-	17	0
						Post Mechanical Shock Measurement										
1.22	1.36	1.49	0.0562	0.3830	-0.14	-0.03	+0.14	0.0630	-2.369	-4.7427	82	82	0	-	18	0
						Post Thermal Shock Measurement										
1.32	1.41	1.56	0.0445	0.6298	-0.07	+0.05	+0.17	0.0489	+3.532	+8.945	82	82	0	-	18	0
						Post Moisture Resistance Measurement										
1.42	1.84	2.74	0.3249	53.0503	-0.10	+0.43	+1.36	0.3323	+30.277	+10.802	71	71	0	-	29	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VK30BX104K

Parameter: Percent Dissipation **Unit:** DF x 100
Nominal Value: Less than 3.0 percent **Lower Limit:** None **GROUPS:** I and II
Upper Limit: 3.0 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.28	1.54	1.98	0.1849	-	-	-	-	-	-	-	98	-	0	-	1	1
						Post Vibration Measurement										
1.30	1.54	1.93	0.1685	0.8304	-0.25	-0.01	+0.18	0.1574	-0.389	-0.3773	98	98	0	-	1	1
						Post Mechanical Shock Measurement										
1.30	1.49	2.00	0.1691	1.0070	-0.47	-0.05	+0.20	0.1069	-3.388	-4.8425	99	98	0	-	1	0
						Post Thermal Shock Measurement										
1.37	1.5[illegible]	2.03	0.1710	1.0226	-0.18	+0.06	+0.32	0.0542	+4.230	+11.602	99	99	0	-	1	0
						Post Moisture Resistance Measurement										
1.52	1.79	2.70	0.2206	1.[illegible]54	+0.07	+0.24	+1.07	0.1660	+15.17[illegible]	+14.147	99	99	0	-	1	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
AEROVOX CAPACITORS - NC605104RK

Parameter: Insulation Leakage GROUPS: I and II

Min. (K megohms)	No.	Nc
	Initial Measurement	
16.667	100	0
	Post Vibration Measurement	
62.500	100	0
	Post Mechanical Shock Measurement	
55.555	100	0
	Post Thermal Shock Measurement	
31.250	100	0
	Post Moisture Resistance Measurement	
0.3571	84	16

COMPUTED STATISTIC SHEET
[illegible] TEST PROCEDURE NUMBER [illegible]-20-02
WESTCAP CAPACITORS - B758BX104K

Parameter: Percent Dissipation
Nominal Value: Less than 2.5 percent
Upper Limit: 2.5 percent

Unit: DF x 100
Lower Limit: None

GROUPS: I and II

Min	Mean	Max	Std	F	[illegible]	MeanD	MaxD	StdD	FC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
0.47	0.67	1.05	0.1403	-	-	-	-	-	-	-	97	-	0	-	3	0
						Post Vibration Measurement										
0.50	0.66	1.04	0.1205	0.7374	-0.38	-0.02	+-.12	0.1112	-2.526	-1.4904	95	95	0	-	4	1
						Post Mechanical Shock Measurement										
0.47	0.62	1.14	0.1353	1.2610	-0.15	-0.04	+0.34	0.0594	-6.0079	-6.5964	96	95	0	-	4	0
						Post Thermal Shock Measurement										
0.57	0.83	1.66	0.2711	4.0115	+0.23	+0.22	+0.78	0.1805	+35.227	+9.390	61	61	0	-	39	0
						Post Moisture Resistance Measurement										
0.63	0.79	1.00	0.1312	0.2342	-0.03	+0.12	+0.37	0.1455	+14.885	+2.557	9	9	0	-	91	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Insulation Leakage GROUPS: I and II

Min. (K megohms)	No	Nc
	Initial Measurement	
3.774	98	2
	Post Vibration Measurement	
4.167	98	2
	Post Mechanical Shock Measurment	
6.452	98	2
	Post Thermal Shock Measurement	
7.143	89	11
	Post Moisture Resistance Measurement	
2.667	87	13

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
GULTON CAPACITORS - CK16M104K

Parameter: Insulation Leakage GROUPS: I and II

Min. (Kmegohms)	No	Nc
	Initial Measurement	
50.000	100	0
	Post Vibration Measurement	
45.455	99	1
	Post Mechanical Shock Measurement	
52.632	100	0
	Post Thermal Shock Measurement	
41.667	97	3
	Post Moisture Resistance Measurement	
1.667	82	18

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CN05M105K

Parameter: Insulation Leakage GROUPS: I and II

Min. (Kmegohms)	No	Nc
	Initial Measurement	
0.1493	97	3
	Post Vibration Measurement	
0.6250	95	5
	Post Mechanical Shock Measurement	
0.0711	97	3
	Post Thermal Shock Measurement	
0.2083	95	5
	Post Moisture Resistance Measurement	
0.1177	72	28

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
KING ELECTRIC CAPACITORS - KC80BW104K

Parameter: Insulation Leakage GROUPS: I and II

Min. (K megohms)	No	Nc
	Initial Measurement	
0.1515	99	1
	Post Vibration Measurement	
0.1389	99	1
	Post Mechanical Shock Measurement	
0.1613	99	1
	Post Thermal Shock Measurement	
1.923	98	2
	Post Moisture Resistance Measurement	
2.778	97	3

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
SCIONICS CAPACITORS - SCM30D104K

Parameter: Insulation Leakage GROUPS: I and II

Min. (K megohms)	No	Nc
	Initial Measurement	
9.091	97	3
	Post Vibration Measurement	
10.204	96	4
	Post Mechanical Shock Measurement	
12.500	96	4
	Post Thermal Shock Measurement	
0.0555	94	6
	Post Moisture Resistance Measurement	
0.4546	61	39

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
EMC CAPACITORS - EK200R104K

Parameter: Insulation Leakage GROUPS: I and II

Min. (K megohms)	No	Nc
	Initial Measurement	
64.516	97	3
	Post Vibration Measurement	
44.444	97	3
	Post Mechanical Shock Measurement	
15.385	99	1
	Post Thermal Shock Measurement	
80.000	84	16
	Post Moisture Resistance Measurement	
2.105	74	26

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Insulation Leakage GROUPS: I and II

Min. (K megohms)	No	Nc
	Initial Measurement	
16.129	98	2
	Post Vibration Measurement	
14.106	94	6
	Post Mechanical Shock Measurement	
19.231	94	6
	Post Thermal Shock Measurement	
20.833	85	15
	Post Moisture Resistance Measurement	
12.500	84	16

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VK30BX104K

Parameter: Insulation Leakage GROUPS: I and II

Min. (K megohms)	No	Nc
	Initial Measurement	
6.667	100	0
	Post Vibration Measurement	
0.0131	97	3
	Post Mechanical Shock Measurement	
2.081	97	3
	Post Thermal Shock Measurement	
1.852	97	3
	Post Mositure Resistance Measurement	
1.786	97	3

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
WESTCAP CAPACITORS - B758BX104K

Parameter: Insulation Leakage GROUPS: I and II

Min. (K megohms)	No	Nc
	Initial Measurement	
7.813	100	0
	Post Vibration Measurement	
0.750	98	2
	Post Mechanical Shock Measurement	
6.250	98	2
	Post Thermal Shock Measurement	
2.500	98	2
	Post Moisture Resistance Measurement	
0.1363	75	25

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - MC605104RK

Parameter: Capacitance
Unit: Nanofarads
Nominal Value: (100.)
Lower Limit (90.0)
Upper Limit: (110.)
GROUPS: Life - 1
50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
91.9	101.49	111.7	4.604	-	-	-	-	-	-	-	75	-	2	0	0	0
						168 Hour Measurement										
91.7	103.68	111.5	4.573	.98641	-4.7	+2.1830	+10.6	4.159	+2.156	4.556	75	75	4	0	0	0
						500 Hour Measurement										
90.6	103.58	112.5	4.802	1.10272	-1.5	+.1000	+2.0	1.167	+0.096	0.742	75	75	3	0	0	0
						1000 Hour Measurement										
93.8	107.12	116.6	5.044	1.10317	+2.5	+3.5386	+4.7	0.4701	+3.416	65.188	75	75	26	0	0	0
						2000 Hour Measurement										
92.7	106.21	115.8	5.104	1.02425	-10.5	-.9080	+0.6	1.279	-0.848	6.148	75	75	22	0	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUPS:** LIFE - 1

Upper Limit: (110.0) 50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
87.2	**93.38**	**96.2**	**2.605**	-	-	-	-	-	-	-	**71**	-	**0**	**6**	**4**	**0**
						168 Hour Measurement										
88.2	92.87	97.9	2.472	.90067	-1.8	-.4036	+1.2	.9290	-4.37	3.653	69	69	0	8	6	0
						500 Hour Measurement										
87.8	92.55	97.4	2.458	.98854	-1.1	-.2029	+6.4	.8319	-2.18	2.011	68	68	0	11	6	1
						1000 Hour Measurement										
88.7	93.50	98.4	2.449	.99271	+0.7	+.9727	+1.7	.2000	+1.051	**39.511**	66	66	0	6	7	2
						2000 Hour Measurement										
88.8	**93.68**	**98.5**	**2.367**	**.93447**	**-0.2**	**+.1216**	**+0.5**	**.1871**	**+1.621**	**6.277**	**60**	**60**	**0**	**4**	**12**	**3**

COMPUTED STATISTIC SHEET

JAN TEST PROCEDURE NUMBER 152-20-02

CULTON CAPACITORS - CK16M104K

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (100.0) Lower Limit: (90.0) GROUP: LIFE-1

Upper Limit: (110.0) 50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
78.9	92.84	102.4	4.613	-	-	-	-	-	-	-	74	-	0	13	1	0
						168 Hour Measurement										
79.8	92.73	101.9	4.540	.96902	-5.9	-.1121	+2.2	1.679	-.121	.574	74	74	0	11	1	0
						500 Hour Measurement										
80.7	93.00	102.8	4.659	1.05282	-0.8	+.2729	+1.2	.6782	+.293	3.451	74	74	0	13	1	0
						1000 Hour Measurement										
82.1	94.35	104.0	4.640	.99212	+0.7	+1.3500	+2.0	.2793	+1.452	27.001	74	74	0	8	1	0
						2000 Hour Measurement										
82.1	94.39	103.8	4.650	1.00422	-0.3	+.0405	+0.7	.2168	+0.043	1.607	74	74	0	8	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Capacitance **Unit:** Microfarads **GROUPS:** LIFE - 1

Nominal Value: (1.0) **Lower Limit** (0.9) 50V 85°C

Upper Limit: (1.1)

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.896	**.9908**	**1.015**	.04924	-	-	-	-	-	-	-	73	-	0	1	2	0
						168 Hour Measurement										
.893	.9964	1.089	.0429	.75965	-.033	+.00?602	+.045	.0236	+.666	2.311	68	68	0	1	7	0
						500 Hour Measurement										
.897	.9986	1.098	.0290	.99810	-.004	+.002191	+.010	.0030	+.220	5.957	68	68	0	1	7	0
						1000 Hour Measurement										
.912	1.0112	1.119	.0439	1.04644	+.008	+.012602	+.021	.0025	+1.262	41.402	68	68	1	0	7	0
						2000 Hour Measurement										
.900	**.9993**	**1.106**	**.0438**	**.99636**	**-.059**	-.01048	**-.006**	.00657	-1.036	**12.973**	64	64	1	0	11	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Capacitance
Nominal Value: (100.0)
Upper Limit: (110.0)
Unit: Nanofarads
Lower Limit (90.0)
GROUPS: LIFE - 1
50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
91.8	**102.59**	**109.2**	**3.686**	-	-	-	-	-	-	-	**67**	-	0	0	8	0
						168 Hour Measurement										
95.3	102.77	105.7	2.061	.31250	-3.2	+1.4295	+4.5	2.383	+1.393	3.978	44	44	0	0	31	0
						500 Hour Measurement										
96.3	102.99	106.6	2.119	1.05793	-0.7	+.2465	+2.0	.6641	+0.240	2.434	43	43	0	0	32	0
						1000 Hour Measurement										
96.8	103.41	107.2	2.314	1.19167	-0.4	+.4139	+4.2	.7563	+0.402	3.589	43	43	0	0	32	0
						2000 Hour Measurement										
95.9	**102.83**	**106.3**	**2.187**	.89314	-4.3	-.6710	0.0	.7523	-0.649	5.498	38	38	0	0	37	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUPS:** LIFE - 1

Upper Limit: (110.0) 50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
89.7	95.62	101.0	2.831	-	-	-	-	-	-	-	67	-	0	1	8	0
						168 Hour Measurement										
91.5	95.78	100.4	2.340	.68309	-1.9	+.1230	+3.4	1.973	+.129	.502	65	65	0	0	8	2
						500 Hour Measurement										
91.5	95.62	100.3	2.387	1.04073	-0.6	-.1370	+0.6	.3347	-.143	3.223	62	62	0	0	10	3
						1000 Hour Measurement										
91.9	96.27	101.1	2.427	1.03387	+0.3	+.6173	+0.8	12.512	+.647	.382	60	60	0	0	10	5
						2000 Hour Measurement										
92.2	96.36	100.9	2.414	.98947	-0.5	+.0866	+0.5	.2828	+.0900	2.371	60	60	0	0	15	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (10.0) **Lower Limit** (9.0) **GROUPS:** LIFE - 1

Upper Limit: (11.0) 50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
9.01	**9.952**	**10.93**	**.4102**	-	-	-	-	-	-	-	**63**	-	0	0	10	2
						168 Hour Measurement										
9.10	9.730	10.46	.3593	.76731	-1.44	-.21879	+.33	.2927	-2.198	**5.693**	58	58	0	0	11	6
						500 Hour Measurement										
9.13	9.805	10.55	.3723	1.07358	-.01	+.07543	+.15	.0310	+0.775	**18.380**	57	57	0	0	12	6
						1000 Hour Measurement										
9.09	9.792	10.54	.3729	1.00353	-0.04	-.01280	+0.01	.0114	-0.131	**8.476**	57	57	0	0	12	6
						2000 Hour Measurement										
9.10	**9.778**	**10.53**	**.3727**	**.99877**	-0.05	-.01535	+0.0;	.0138	-.1568	**8.333**	56	56	0	0	19	0

COMPUTED STATISTIC SHEET

JEL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) [redacted] LIFE = 1

Upper Limit: (110.0) 50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	[redacted]					
						Initial Measurement									
88.8	96.98	103.9	3.997	-	-	-	-	-	-	-	74	-	0	4	1	0
						168 Hour Measurement									
85.4	95.10	104.5	3.931	.96701	-6.0	-1.9513	+2.5	2.161	-2.012	[redacted]	72	72	0	6	3	0
						500 Hour Measurement									
85.8	95.27	104.0	3.905	.98686	-1.0	+.1680	+1.0	.4037	+0.177	[redacted]	72	72	0	6	3	0
						1000 Hour Measurement									
85.5	94.97	102.9	3.878	.98616	-1.3	-.3013	+0.3	.3209	-0.316	[redacted]	72	72	0	6	3	0
						2000 Hour Measurement									
85.5	95.07	103.4	3.920	1.02181	-1.8	+.2085	+0.9	.3860	+.2195	[redacted]	70	70	0	6	5	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUPS:** LIFE - 1

Upper Limit: (110.0) 50V 85°C.

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
87.5	94.27	106.1	3.997	-	-	-	-	-	-	-	38	-	0	4	37	0
						168 Hour Measurement										
81.1	94.93	105.7	5.506	1.89764	-14.2	+.3600	+5.7	6.517	+0.382	0.326	35	35	0	8	40	0
						500 Hour Measurement										
81.1	94.73	105.0	5.382	.95543	-0.9	-.0200	+0.9	.4940	-0.021	0.239	35	35	0	8	40	0
						1000 Hour Measurement										
81.5	95.41	106.5	5.670	1.11017	+0.1	+1.0428	+1.5	.4037	+1.105	15.281	35	35	0	8	40	0
						2000 Hour Measurement										
82.1	95.88	106.8	5.750	1.02833	-0.2	+.4657	+1.1	.2449	+.4881	11.248	35	35	0	7	40	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - MC605104RK

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUPS:** LIFE - 2

Upper Limit: (110.0) 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
95.7	102.97	109.9	4.060	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
97.2	108.82	117.7	5.748	2.00418	-0.4	+5.7785	+15.0	5.586	+5.612	3.871	14	14	5	0	1	0
						500 Hour Measurement										
96.1	107.42	116.2	5.398	.88210	-3.2	-1.3928	-0.6	.7817	-1.280	6.667	14	14	3	0	1	0
						1000 Hour Measurement										
99.5	110.82	118.2	5.281	.95693	+2.0	+3.3928	+4.1	.5206	+3.158	24.386	14	14	10	0	1	0
						2000 Hour Measurement										
102.1	114.32	121.8	5.439	1.06092	+2.5	+3.5000	+4.9	.6768	+3.158	19.351	14	14	12	0	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R106K

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUP:** LIFE - 2

Upper Limit: (110.0) 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	[illegible]	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
89.0	93.31	96.2	2.141	- -	-	-	-	-	-	-	15	-	0	2	0	0
						168 Hour Measurement										
90.1	94.30	96.5	2.051	.91755	-0.1	+.9933	+2.4	.8849	+1.065	4.348	15	15	0	0	0	0
						500 Hour Measurement										
90.2	94.22	96.5	2.080	1.02804	-0.2	+.0500	+0.3	.1581	+.053	1.183	[illegible]	14	0	0	1	0
						1000 Hour Measurement										
90.9	95.25	97.7	2.275	1.19699	+0.7	+1.0538	+1.2	.1483	+1.118	25.616	13	13	0	0	2	0
						2000 Hour Measurement										
92.1	96.65	99.3	2.356	1.07204	+1.1	+1.3545	+1.7	.2097	+1.422	21.417	11	11	0	0	4	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CK16M104K

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUPS:** LIFE - 2

Upper Limit: (110.0) 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	Me	My	Mu	Nl	Nc	Nt
						Initial Measurement										
74.6	92.88	104.0	6.631	-	-	-	-	-	-	-	14	-	0	2	1	0
						108 Hour Measurement										
77.0	93.90	103.2	6.285	.89818	-1.2	+1.0214	+3.2	1.663	+1.100	2.298	15	15	0	1	1	0
						500 Hour Measurement										
76.4	92.75	102.7	6.277	.99767	-1.4	+0.6923	+0.3	.2983	-0.737	3.367	13	13	0	1	1	1
						1000 Hour Measurement										
77.2	94.11	103.7	6.350	1.02344	+0.8	+1.3615	+2.2	.4231	+1.468	11.603	13	13	0	1	1	1
						2000 Hour Measurement										
78.4	95.46	104.6	6.616	1.08554	+0.5	+.15500	+2.4	.6481	+.1647	0.828	12	12	0	1	3	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Capacitance **Unit:** Microfarads

Nominal Value: (1.0) **Lower Limit** (0.9) **GROUPS:** LIFE - 2

Upper Limit: (1.1) 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.890	1.0012	1.088	.0615	-	-	-	-	-	-	-	14	-	0	1	1	0
						168 Hour Measurement										
.937	1.0143	1.083	.0423	.4748/	-.010	+.017307	+.053	.0257	+1.729	2.430	13	13	0	0	2	0
						500 Hour Measurement										
.935	1.0098	1.084	.0433	1.04662	-.003	-.001333	+.001	.0013	-0.131	3.442	12	12	0	0	3	0
						1000 Hour Measurement										
.941	1.0175	1.090	.0457	1.11175	+.004	+.007090	+.010	.0018	+0.702	12.753	11	11	0	0	3	1
						2000 Hour Measurement										
.941	1.0197	1.096	.0461	1.02032	-.003	+.002090	+.007	.0031	+.2054	2.214	11	11	0	0	4	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Capacitance
Unit: Nanofarads
Nominal Value: (100.0)
Lower Limit (90.0)
Upper Limit: (110.0)
GROUPS: LIFE - 2
50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
90.5	104.16	117.5	9.9647	-	-	-	-	-	-	-	15	-	6	0	0	0
						168 Hour Measurement										
91.1	104.78	116.9	10.311	1.07078	-1.3	+.6266	+3.7	1.268	+0.602	1.913	15	15	6	0	0	0
						500 Hour Measurement										
90.7	104.40	116.4	10.289	.99565	-0.7	-.3800	-0.1	.1612	-0.363	9.127	15	15	6	0	0	0
						1000 Hour Measurement										
91.4	105.16	117.0	10.250	.99244	+0.4	+.7600	+1.1	.1844	+0.728	15.963	15	15	6	0	0	0
						2000 Hour Measurement										
92.6	106.34	118.0	10.108	.97254	+0.6	+1.1800	+2.0	.5683	+1.122	8.041	15	15	9	0	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103K V-LAM.

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (10.0) Lower Limit (9.0) GROUPS: LIFE - 2

Upper Limit: (11.0) 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
9.01	10.056	10.93	.3045	-	-	-	-	-	-	-	63	-	0	0	10	2
						168 Hour Measurement										
9.57	10.049	10.78	.3394	1.24293	-0.37	+.00384	+0.28	.1940	+0.038	0.071	13	13	0	0	1	1
						500 Hour Measurement										
9.55	10.028	10.81	.3474	1.04747	-0.08	-.02076	+0.04	.0361	-0.207	2.076	13	13	0	0	1	1
						1000 Hour Measurement										
9.64	10.130	10.92	.4036	1.40218	-0.12	+.10164	+0.89	.2428	+1.012	1.508	13	13	0	0	1	1
						2000 Hour Measurement										
9.68	10.168	10.91	.3296	.64190	-0.79	-.00250	+0.26	.2570	-.02468	.0316	12	12	0	0	3	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUPS:** LIFE - 2

Upper Limit: (110.0) 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
92.0	97.40	103.4	4.149	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
93.4	98.20	103.4	2.804	.45655	-2.6	+.1461	+3.2	2.407	+0.150	0.217	13	13	0	0	1	1
						500 Hour Measurement										
91.9	97.48	102.2	2.732	.94987	-1.2	-.7153	-0.2	.3256	-0.728	7.921	13	13	0	0	1	1
						1000 Hour Measurement										
93.3	98.02	102.8	2.736	1.00281	-0.2	+.9357	+2.4	.5916	+0.960	5.918	14	13	0	0	1	0
						2000 Hour Measruement										
95.1	99.21	103.4	2.665	.94884	+0.4	+1.1000	+2.6	.5621	+1.122	7.055	13	13	0	0	2	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUPS:** LIFE - 2

Upper Limit: (110.0) 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
87.0	89.67	97.3	3.064	-	-	-	-	-	-	-	10	0		5	5	0
						168 Hour Measurement										
85.5	90.27	96.2	3.372	1.21148	-8.9	+.6000	+8.0	5.182	+0.669	0.366	10	10	0	6	5	0
						500 Hour Measurement										
85.9	90.37	95.4	3.193	.89657	-1.6	+.1000	+8.5	2.968	+0.111	0.105	10	10	0	6	5	0
						1000 Hour Measurement										
86.0	91.30	97.9	3.653	1.30926	-8.0	+.9300	+3.3	3.193	+1.029	0.921	10	10	0	5	5	0
						2000 Hour Measurement										
87.6	93.50	99.8	3.468	.90080	+0.3	+2.2000	+3.0	.9039	+2.410	7.697	10	10	0	1	5	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - MC605104RK

Parameter: Capacitance Unit: Nanofarads GROUPS: LIFE - 3

Nominal Value: (100.0) Lower Limit (90.0) 100V 85°C

Upper Limit: (110.0)

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
91.1	101.98	109.6	5.513	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
92.7	100.15	109.2	5.047	.83794	-7.3	-1.8333	+6.9	3.687	-1.798	1.926	15	15	0	0	0	0
						500 Hour Measurement										
90.6	98.39	106.6	4.928	.95328	-2.6	-1.1466	+6.9	2.325	-1.145	1.910	15	15	0	0	0	0
						1000 Hour Measurement										
91.2	98.60	107.1	4.921	.99715	-0.2	+.2133	+0.9	.3376	+0.217	2.447	15	15	0	0	0	0
						2000 Hour Measurement										
92.0	99.73	108.9	5.122	1.08338	+0.6	+1.1266	+1.9	.3962	+1.143	11.012	15	15	0	0	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (100.0) Lower Limit (90.0) GROUPS: LIFE - 3

Upper Limit: (110.0) 100V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
90.0	93.80	98.0	2.206	-	-	-	-	-	-	-	13	-	0	0	2	0
						168 Hour Measurement										
89.3	91.60	95.4	1.804	.66837	-3.5	-2.2076	-0.7	.8832	-2.354	9.012	13	13	0	3	2	0
						500 Hour Measurement										
89.2	91.31	95.0	1.739	.92929	-0.7	-.2846	-0.1	.1897	-0.311	5.408	13	13	0	4	2	0
						1000 Hour Measurement										
89.0	91.22	100.5	1.727	.98676	-0.6	-.2416	-0.1	.1483	-0.265	5.643	12	12	0	3	2	1
						2000 Hour Measurement										
89.8	91.56	93.8	1.358	.61816	+0.5	+.7818	+.10	.1703	+.8570	15.226	11	11	0	1	4	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CK16M104K

Parameter: Capacitance
Nominal Value: (100.0)
Upper Limit: (110.0)

Unit: Nanofarads
Lower Limit (90.0)

GROUPS: LIFE - 3
100V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
83.2	94.08	102.9	5.305	-	-	-	-	-	-	-	13	-	0	2	1	1
						168 Hour Measurement										
81.7	93.10	101.9	5.587	1.10910	-3.4	-.9769	+1.7	1.490	-1.038	2.364	13	13	0	4	1	1
						500 Hour Measurement										
81.4	92.96	102.1	5.713	1.04568	-0.4	-.1384	+0.2	.1732	-0.149	2.881	13	13	0	4	1	1
						1000 Hour Measurement										
81.7	93.05	102.1	5.651	.97828	+0.3	+.0846	+0.7	.2569	+0.091	1.187	13	13	0	4	1	1
						2000 Hour Measurement										
82.2	93.51	102.5	5.605	.98371	+0.3	+.4615	+0.9	.1549	+.4960	10.741	13	13	0	3	2	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Capacitance — Unit: Microfarads

Nominal Value: (1.0) — Lower Limit (0.9) — GROUPS: LIFE - 3-

Upper Limit: (1.1) — 100V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.915	.9895	1.088	.0555	-	-	-	-	-	-	-	14	-	0	0	1	0
						168 Hour Measurement										
.913	.9880	1.075	.0526	.90103	-.038	-.006615	+.035	.0269	-0.669	0.886	13	13	0	0	2	0
						500 Hour Measurement										
.907	.9817	1.067	.0523	.98686	-.010	-.006307	-.004	.0015	-0.638	15.331	13	13	0	0	2	0
						1000 Hour Measurement										
.899	.9746	1.060	.0526	1.01049	-.008	-.007076	-.006	.0008	-0.721	30.494	13	13	0	1	2	0
						2000 Hour Measurement										
.908	.9814	1.066	.05261	1.00137	+.004	+.006769	+.009	.00145	+.6946	16.842	13	13	0	0	2	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

KING ELECTRIC CAPACITORS - KC80BW104K

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUPS:** LIFE - 3

Upper Limit: (110.0) 100V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
87.0	100.51	116.4	11.839	-	-	-	-	-	-	-	15	-	6	3	0	0
						168 Hour Measurement										
87.2	99.62	114.5	11.124	.88282	-3.9	-.8933	+6.8	2.463	-0.889	1.404	15	15	5	4	0	0
						500 Hour Measurement										
86.4	98.58	114.3	11.705	1.10720	-10.4	-1.0400	-0.1	2.596	-1.044	1.551	15	15	5	5	0	0
						1000 Hour Measurement										
86.1	98.19	113.8	11.726	1.00359	-0.8	-.3866	-0.1	.1703	-0.392	8.792	15	15	5	5	0	0
						2000 Hour Measurement										
86.8	98.94	114.5	11.588	.97662	+0.4	+.7466	+1.2	.2214	+.7604	13.063	15	15	5	5	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUP8:** LIFE - 3

Upper Limit: (110.0) 100V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
93.4	100.61	103.4	2.666	-	-	-	-	-	-	-	14	-	0	0	1	0
						168 Hour Measurement										
91.9	97.40	99.7	2.357	.78126	-5.4	-2.5454	-0.1	2.060	-2.530	4.098	11	11	0	0	4	0
						500 Hour Measurement										
90.3	95.82	98.3	2.346	.99135	-2.0	-1.5727	-1.3	.2049	-1.615	25.452	11	11	0	0	4	0
						1000 Hour Measurement										
89.1	94.83	97.2	2.402	1.04758	-1.2	-0.9909	-0.7	.1844	-1.034	17.823	11	11	0	1	4	0
						2000 Hour Measurement										
93.6	95.84	97.9	1.846	.59101	+0.4	+.6285	+0.8	.1483	+.6628	11.211	7	7	0	0	8	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Capacitance — Unit: Nanofarads

Nominal Value: (100.0) — Lower Limit (90.0) — GROUPS: LIFE - 3

Upper Limit: (110.0) — 100V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
92.6	97.07	105.4	3.509	-	-	-	-	-	-	-	14	-	0	0	1	0
						168 Hour Measurement										
91.3	95.43	102.1	2.804	.63856	-3.5	-1.6428	+1.3	2.133	-1.692	2.881	14	14	0	0	1	0
						500 Hour Measurement										
90.7	94.90	101.5	2.884	1.05800	-0.6	.5384	-0.4	.0707	-0.564	27.453	13	13	0	0	2	0
						1000 Hour Measurement										
90.5	94.80	101.1	2.864	.98641	-0.4	-.1000	+1.0	1.414	-0.105	.2550	13	13	0	0	2	0
						2000 Hour Measurement										
91.2	95.34	101.9	2.877	1.00865	+0.4	+.5461	+0.8	.1265	+.5761	15.566	13	13	0	0	2	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (10.0) Lower Limit (9.0) GROUPS: LIFE - 3

Upper Limit: (11.0) 100V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
9.32	9.921	10.87	.4852	-	-	-	-	-	-	-	11	-	0	0	4	0
						168 Hour Measurement										
9.20	9.601	10.52	.3571	.54161	-1.20	-.26909	-0.02	.3965	-2.712	2.251	11	11	0	0	4	0
						500 Hour Measurement										
9.22	9.610	10.48	.3442	.92946	-0.04	+.00818	+0.02	.0356	+0.085	0.761	11	11	0	0	4	0
						1000 Hour Measurement										
9.13	9.520	10.37	.3378	.96303	-0.11	-.09000	-0.08	.0118	-0.937	25.228	11	11	0	0	4	0
						2000 Hour Measurement										
9.20	9.585	10.47	.3451	1.04328	+0.04	+.06545	+0.10	.0155	+.6875	14.012	11	11	0	0	4	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter: Capacitance
Unit: Nanofarads
Nominal Value: (100.0)
Lower Limit (90.0)
GROUPS: LIFE - 3
Upper Limit: (110.0)
100V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
89.8	96.31	104.1	4.581	-	-	-	-	-	-	-	15	-	0	1	0	0
						168 Hour Measurement										
89.3	92.99	99.2	3.119	.46355	-6.4	-3.4153	+0.2	2.622	-3.546	4.696	13	13	0	3	2	0
						500 Hour Measurement										
88.8	92.28	98.6	3.073	.97060	-1.1	-.7076	-0.2	.2720	-0.761	9.379	13	13	0	3	2	0
						1000 Hour Measurement										
85.8	90.70	97.4	3.225	1.10113	-3.4	-1.2307	+2.3	1.225	-1.334	3.619	13	13	0	4	2	0
						2000 Hour Measurement										
87.6	92.20	98.8	3.334	1.06905	+0.9	+1.3166	+1.8	.2646	+1.452	17.238	12	12	0	3	3	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUPS:** LIFE - 3

Upper Limit: (110.0) 100V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
85.7	88.64	94.8	3.491	-	-	-	-	-	-	-	7	-	0	5	8	0
						168 Hour Measurement										
83.8	85.30	87.3	1.376	.15530	-7.5	-3.3428	-1.5	2.414	-3.771	3.664	7	7	0	7	8	0
						500 Hour Measurement										
82.7	84.58	86.5	1.324	.92657	-1.1	-.7142	-0.3	.2793	-0.837	6.766	7	7	0	7	8	0
						1000 Hour Measurement										
83.1	84.84	86.4	1.112	.70467	-2.2	+.2571	+0.8	.3194	+0.304	2.130	7	7	0	7	8	0
						2000 Hour Measurement										
83.3	85.34	87.3	1.381	1.54207	+0.1	+.5000	+0.9	.3742	+.5893	3.536	7	7	0	7	8	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - MC605104RK

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUP:** LIFE - 4

Upper Limit: (110.0) 100V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
96.4	101.06	107.8	3.802	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
94.1	102.21	107.7	4.224	1.23426	-4.1	+1.1466	+8.5	3.747	+1.135	1.185	15	15	0	0	0	0
						500 Hour Measurement										
92.1	100.43	105.5	4.127	.95460	-2.3	-1.7800	-1.0	.4278	-1.742	16.115	15	15	0	0	0	0
						1000 Hour Measurement										
94.0	102.84	108.9	4.442	1.15832	+1.6	+2.4066	+3.4	.5568	+2.396	16.740	15	15	0	0	0	0
						2000 Hour Measurement										
99.2	108.45	114.8	4.952	1.24285	+5.2	+5.7500	+6.8	.5225	+5.591	41.177	14	14	6	0	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0). **GROUPS:** LIFE - 4

Upper Limit: (110.0) 100V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
91.2	94.36	97.6	1.587	-	-	-	-	-	-	-	13	-	0	0	2	0
						168 Hour Measurement										
90.0	94.30	96.4	1.719	1.17401	-1.2	-.2500	+.09	.7688	-0.265	1.126	12	12	0	0	2	1
						500 Hour Measurement										
89.0	93.51	95.7	1.851	1.15905	-1.0	-.7916	-0.3	.3493	-0.839	2.851	12	12	0	1	2	1
						1000 Hour Measurement										
90.4	94.74	97.1	1.963	1.12467	-2.1	+1.4923	+6.2	1.719	+1.596	3.130	13	12	0	0	2	0
						2000 Hour Measurement										
93.0	97.45	99.8	1.876	,91329	-2.2	+2.0363	+3.1	1.455	+2.149	4.643	11	11	0	0	4	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CK10M104K

Parameter: Capacitance
Unit: Nanofarads
Nominal Value: (100.0)
Lower Limit (90.0)
Upper Limit: (110.0)
GROUPS: LIFE - 4
100V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
83.8	92.04	98.0	3.948	-	-	-	-	-	-	-	15	-	0	4	0	0
						168 Hour Measurement										
84.7	91.98	97.5	3.522	.79595	-2.8	-.0533	+1.7	1.452	-0.058	0.141	15	15	0	3	0	0
						500 Hour Measurement										
83.6	90.86	96.1	3.541	1.01080	-1.7	-1.1200	-0.7	.2933	-1.218	14.792	15	15	0	5	0	0
						1000 Hour Measurement										
84.5	91.95	97.5	3.560	1.01060	+0.7	+1.0860	+1.5	.2550	+1.196	16.507	15	15	0	3	0	0
						2000 Hour Measurement										
87.1	94.49	101.2	3.609	1.02761	+1.1	+2.5400	+3.9	.8933	+2.762	11.012	15	15	0	0	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M1105K

Parameter: Capacitance **Unit:** Microfarads

Nominal Value (1.0) **Lower Limit** (0.9) **GROUPS:** LIFE - 4

Upper Limit: (1.1) 100V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.912	1.0015	1.069	.0521	-	-	-	-	-	-	-	13	-	0	0	2	0
						168 Hour Measurement										
.912	1.0078	1.058	.0451	.74793	-.032	+.010333	+.047	.0285	+1.032	1.250	12	12	0	0	3	0
						500 Hour Measurement										
.871	.9850	1.042	.0456	1.02011	-.047	-.022750	-.008	.0146	-2.257	5.410	12	12	0	1	3	0
						1000 Hour Measurement										
.884	.9935	1.052	.0466	1.04482	+.006	+.010363	+.013	.0023	+1.052	15.072	11	11	0	1	4	0
						2000 Hour Measurement										
.903	.9972	1.056	.0475	1.03944	+.001	+.005555	+.019	.00539	+.5586	3.095	9	9	0	0	6	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (100.0) Lower Limit (90.0) GROUPS: LIFE - 4

Upper Limit: (110.0) 100V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
88.5	101.96	114.4	10.881	-	-	-	-	-	-	-	15	-	6	3	0	0
						168 Hour Measurement										
87.1	101.25	113.5	11.169	1.05359	-2.7	-.7133	+1.1	1.331	-0.700	2.076	15	15	6	4	0	0
						500 Hour Measurement										
87.1	101.07	112.0	10.806	.93595	-1.5	-1.1928	-0.9	.2121	-1.178	21.039	14	14	6	3	1	0
						1000 Hour Measurement										
88.1	102.11	113.0	10.809	1.00059	+0.9	+1.0428	+1.3	.1140	+1.032	34.221	14	14	6	3	1	0
						2000 Hour Measurement										
90.6	104.42	114.6	10.436	.93220	+1.1	+2.3142	+4.1	.9268	+2.266	9.343	14	14	7	0	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Capacitance — Unit: Nanofarads

Nominal Value: (100.0) — Lower Limit (90.0) — GROUPS: LIFE - 4

Upper Limit: (110.0) — 100V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
99.3	102.05	104.9	1.862	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
98.1	100.47	107.4	2.640	2.01125	-4.6	-1.5000	+2.5	2.508	-1.470	1.892	10	-10	0	0	5	0
						500 Hour Measurement										
94.5	95.75	97.5	1.261	.22815	-4.0	-3.7500	-3.6	.1897	-3.132	23.717	4	4	0	0	11	0
						1000 Hour Measurement										
-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	15	0
						2000 Hour Measurement										
-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	15	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Capacitance
Unit: Nanofarads
Nominal Value: (100.0)
Lower Limit (90.0)
GROUPS: LIFE - 4
Upper Limit: (110.0)
100V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
91.5	95.20	99.9	2.167	-	-	-	-	-	-	-	12	-	0	0	3	0
						168 Hour Measurement										
92.5	94.90	98.3	1.960	.81789	-2.2	-.3000	+2.4	2.131	-0.315	0.487	12	12	0	0	3	0
						500 Hour Measurement										
91.6	93.98	97.2	1.914	.95442	-1.1	-.9250	-0.9	.0707	-0.975	45.316	12	12	0	0	3	0
						1000 Hour Measurement										
92.6	94.93	98.2	1.990	1.08049	+0.8	+1.0090	+1.2	.1095	+1.074	30.549	11	11	0	0	4	0
						2000 Hour Measurement										
94.9	97.16	100.7	2.092	1.10555	+1.8	+2.2272	+2.5	.2683	+2.346	27.529	11	11	0	0	4	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - MC605104RK

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (100.0) Lower Limit (90.0) GROUPS: LIFE - 5

Upper Limit: (110.0) 200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
91.9	99.72	108.8	5.673	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
87.1	92.98	99.2	4.759	.70365	-11.5	-6.7400	+0.9	3.733	-6.759	6.992	15	15	0	7	0	0
						500 Hour Measurement										
84.2	89.60	96.8	4.703	.97677	-5.0	-3.3800	-2.3	.7570	-3.635	17.294	15	15	0	8	0	0
						1000 Hour Measurement										
83.7	89.12	95.8	4.624	.96686	-0.9	-.4800	-0.2	.2258	-0.536	8.232	15	15	0	8	0	0
						2000 Hour Measurement										
84.8	90.61	98.8	5.007	1.17244	+0.8	+1.4866	+3.0	.5310	+1.668	10.842	15	15	0	8	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (100.0) Lower Limit (90.0) GROUPS: LIFE - 5

Upper Limit: (110.0) 200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
89.9	92.80	100.9	3.094	-	-	-	-	-	-	-	13	-	0	1	2	0
						168 Hour Measurement										
85.3	88.66	95.1	2.909	.88415	-5.8	-4.0833	-2.5	1.087	-4.400	13.016	12	12	0	8	2	1
						500 Hour Measurement										
84.1	87.18	93.7	2.917	1.00496	-1.9	-1.4833	-1.2	.2387	-1.673	21.522	12	12	0	10	2	1
						1000 Hour Measurement										
83.7	86.93	93.2	2.843	.95015	-1.2	-.7900	-0.4	.2683	-0.906	9.310	10	10	0	9	2	3
						2000 Hour Measurement										
84.7	88.62	94.2	2.766	.94667	+1.0	+1.3333	+1.7	.2828	+1.534	14.142	9	9	0	6	6	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CK16M104K

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (100.0) Lower Limit (90.0). GROUPS: LIFE - 5

Upper Limit: (110.0) 200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
88.0	93.78	101.1	3.397	-	-	-	-	-	-	-	15	-	0	1	0	0
						168 Hour Measurement										
85.8	89.40	95.3	2.671	.61819	-7.6	-4.3800	-2.0	1.854	-4.671	9.152	15	15	0	9	0	0
						500 Hour Measurement										
84.5	87.81	94.2	2.691	1.01471	-2.3	-1.5866	-1.1	.3536	-1.775	17.380	15	15	0	13	0	0
						1000 Hour Measurement										
84.1	87.12	93.3	2.549	.89777	-1.2	-.6866	-0.1	.3348	-0.782	7.946	15	15	0	13	0	0
						2000 Hour Measurement										
85.2	88.50	94.5	2.692	1.11524	+0.8	1.2571	+1.6	.2490	+1.443	18.891	14	14	0	12	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Capacitance Unit: Microfarads

Nominal Value: (1.0) Lower Limit (0.9) GROUPS: LIFE - 5

Upper Limit: (1.1) 200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.902	.9805	1.051	.0451	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
.882	.9580	1.038	.0519	1.32520	-.053	-.030692	+.013	.0256	-3.130	4.321	13	13	0	2	2	0
						500 Hour Measurement										
.860	.9269	1.011	.0540	1.08035	-.051	-.025500	+.010	.0142	-2.662	6.226	12	12	0	4	3	0
						1000 Hour Measurement										
.826	.8996	.994	.0546	1.02314	-.035	-.019400	-.015	.0060	-2.093	10.168	10	10	0	5	5	0
						2000 Hour Measurement										
.837	.9143	1.012	.0590	1.16995	+.011	+.016333	+.020	.00249	+1.815	19.678	9	9	0	4	6	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

KING ELECTRIC CAPACITORS - KC80BW104K

Parameter: Capacitance — Unit: Nanofarads

Nominal Value: (100.0) — Lower Limit (90.0) — GROUPS: LIFE - 5

Upper Limit: (110.0) — 200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
88.0	100.31	116.1	10.332	-	-	-	-	-	-	-	15	-	4	2	0	0
						168 Hour Measurement										
84.6	96.04	111.0	10.147	.13197	-6.8	-3.5800	+2.0	2.726	-3.800	5.087	15	15	3	5	0	0
						500 Hour Measurement										
82.5	94.30	112.2	10.642	1.09997	-2.4	-1.7466	+1.2	.8955	-1.819	7.554	15	15	1	6	0	0
						1000 Hour Measurement										
81.0	93.64	114.2	10.673	1.00572	-7.9	-.6533	+6.9	3.361	-0.693	0.752	15	15	1	8	0	0
						2000 Hour Measurement										
83.2	95.40	109.7	9.531	.79747	-5.6	1.7600	+5.4	7.817	+1.880	.8720	15	15	0	4	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (100.0) Lower Limit (90.0) GROUPS: LIFE - 5

Upper Limit: (110.0) 200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
92.9	100.80	104.8	2.863	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
89.4	95.34	105.4	5.062	3.12638	-9.6	-5.0800	+.37	4.946	-5.040	3.248	10	10	0	1	5	0
						500 Hour Measurement										
86.2	91.42	103.3	5.807	1.31599	-11.4	-4.0285	-3.2	3.554	-4.225	2.999	7	7	0	4	7	1
						1000 Hour Measurement										
84.9	91.43	101.0	7.471	1.65494	-5.2	-4.600	+7.0	4.489	-0.503	2.291	5	4	0	3	10	0
						2000 Hour Measurement										
85.6	89.10	92.6	4.950	.43896	-5.5	-2.4000	+0.7	4.384	-2.622	.7740	2	2	0	1	13	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Capacitance

Nominal Value: (100.0) Unit: Nanofarads

Upper Limit: (110.0) Lower Limit (90.0)

GROUPS: LIFE - 5

200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
91.5	97.24	100.8	2.628	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
90.0	93.12	95.4	1.683	.41024	-6.7	-4.4500	-1.5	1.994	-4.576	8.350	14	14	0	0	0	1
						500 Hour Measurement										
88.3	91.95	96.6	2.420	2.06669	-2.0	-1.0769	+4.1	1.806	-1.156	2.150	13	13	0	4	0	2
						1000 Hour Measurement										
87.9	93.16	98.2	3.655	2.28068	-0.7	+1.2666	+6.4	.2663	+1.377	1.648	12	12	0	3	0	3
						2000 Hour Measurement										
90.9	95.85	99.9	2.901	.62995	-5.7	+2.6833	+6.9	4.507	+2.880	2.063	12	12	0	0	3	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (10.0) Lower Limit (9.0) GROUPS: LIFE - 5

Upper Limit: (11.0) 200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
9.42	9.807	10.21	.2442	-	-	-	-	-	-	-	14	-	0	0	1	0
						168 Hour Measurement										
9.13	9.562	9.84	.1800	.54333	-.47	-.24500	+.03	.1756	-2.498	5.222	14	14	0	0	1	0
						500 Hour Measurement										
8.88	9.362	9.64	.1870	1.07867	-.26	-.19928	-.16	.0336	-2.084	22.181	14	14	0	1	1	0
						1000 Hour Measurement										
9.02	9.229	9.61	.1618	.74914	-.26	-.13357	+.30	.1673	-1.427	2.987	14	14	0	0	1	0
						2000 Hour Measurement										
8.73	9.266	9.53	.1912	1.39633	-0.39	+.03714	+0.16	.1762	+.4024	.7880	14	14	0	1	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (100.0) Lower Limit (90.0) GROUPS: LIFE - 5

Upper Limit: (110.0) 200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
90.8	97.76	103.5	4.685	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
87.0	91.33	96.0	3.299	.49580	-10.2	-6.433	-3.0	2.427	-6.581	10.268	15	15	0	6	0	0
						500 Hour Measurement										
84.1	89.92	96.0	3.592	1.18561	-3.8	-1.6928	+3.3	2.349	-1.853	2.696	14	14	0	5	0	1
						1000 Hour Measurement										
80.0	87.51	97.4	5.336	2.20669	-5.9	-1.9384	+5.7	3.303	-2.156	2.116	13	13	0	10	1	1
						2000 Hour Measurement										
82.7	88.86	98.4	4.257	.63635	-6.5	+1.3461	+3.0	2.451	+1.538	1.980	13	13	0	8	2	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - MC605104RK

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUP:** LIFE - 6

Upper Limit: (110.0) 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
96.5	101.53	109.2	4.311	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
90.1	99.87	112.3	6.390	2.19725	-7.7	-2.1461	+4.8	4.343	-2.114	1.782	13	13	1	0	2	0
						500 Hour Measurement										
85.7	95.53	111.8	7.226	1.27865	-6.7	-4.3461	+0.4	2.103	-4.352	7.453	13	13	1	3	2	0
						1000 Hour Measurement										
80.6	91.52	115.5	10.073	1.94315	-6.7	-4.2333	+1.8	3.349	-4.431	4.379	12	12	1	6	3	0
						2000 Hour Measurement										
90.5	101.62	113.6	6.547	.42242	-1.9	+9.1090	+12.5	5.340	+9.953	5.658	11	11	1	0	4	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (100.0) Lower Limit (90.0) GROUPS: LIFE - 6

Upper Limit: (110.0) 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
86.9	91.63	96.5	-	-	-	-	-	-	-	-	13	-	0	5	2	0
						168 Hour Measurement										
86.1	90.81	96.7	2.930	1.13018	-4.0	-.9833	+0.2	1.191	-1.073	2.859	12	12	0	5	3	0
						500 Hour Measurement										
84.5	89.15	94.7	2.805	.91660	-2.6	-1.666	-1.2	.3912	-1.835	14.760	12	12	0	7	3	0
						1000 Hour Measurement										
82.1	85.61	89.5	2.563	.83456	-5.2	-3.533	-2.2	.9466	-3.963	12.931	12	12	0	12	3	0
						2000 Hour Measurement										
87.7	91.80	96.7	2.632	1.05511	+5.0	+6.1833	+.82	.8922	+7.223	24.008	12	12	0	2	3	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CK16M104K

Parameter: Capacitance **Unit:** Nanofarads

Nominal Value: (100.0) **Lower Limit** (90.0) **GROUPS:** LIFE - 6

Upper Limit: (110.0) 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
86.7	94.04	101.5	3.403	-	-	-	-	-	-	-	15	-	0	2	0	0
						168 Hour Measurement										
84.9	95.44	102.8	4.329	1.61834	-2.3	+1.4066	+5.7	2.539	+1.496	2.146	15	15	0	2	0	0
						500 Hour Measurement										
82.1	94.17	102.4	5.171	1.42684	-2.9	-1.2733	-0.2	1.283	-1.334	3.843	15	15	0	2	0	0
						1000 Hour Measurement										
79.4	93.88	103.3	6.868	1.76370	-4.4	-2.866	+1.8	2.150	-0.304	5.163	15	15	0	5	0	0
						2000 Hour Measurement										
86.4	95.72	102.6	3.882	.31953	-0.8	+1.8333	+7.0	3.716	+1.953	1.910	15	15	0	2	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Capacitance — **Unit:** Microfarads

Nominal Value: (1.0) — Lower Limit (0.9)

Upper Limit: (1.1)

GROUPS: LIFE - 6, 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.920	.9867	1.087	.0515	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
.842	.9395	1.024	.0483	.87843	-1.29	-.046500	+.011	.0414	-4.713	3.895	12	12	0	1	3	0
						500 Hour Measurement										
.863	.9214	.997	.0427	.78162	-.040	-.026100	-.023	.0050	-2.778	16.441	10	10	0	3	5	0
						1000 Hour Measurement										
.844	.8742	.938	.0297	.48352	-.057	-.045000	-.034	.0071	-4.884	17.805	8	8	0	7	7	0
						2000 Hour Measurement										
.884	.9121	.980	.0322	1.18132	+.037	+.039857	+.042	.00176	+4.560	59.893	7	7	0	3	8	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Capacitance — **Unit:** Nanofarads — GROUPS: LIFE - 6

Nominal Value: (100.0) — Lower Limit (90.0) — 200V 125°C

Upper Limit: (110.0)

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
88.0	102.16	116.2	10.468	-	-	-	-	-	-	-	15	-	5	2	0	0
						168 Hour Measurement										
87.9	101.06	113.3	9.881	.89105	-4.0	-1.0933	+2.4	1.828	-1.070	2.317	15	15	5	3	0	0
						500 Hour Measurement										
85.4	96.30	110.5	8.927	.81613	-4.1	-2.9615	+0.2	1.319	-2.930	8.097	13	13	1	3	1	1
						1000 Hour Measurement										
82.4	93.21	107.7	8.527	.91248	-4.7	-3.0923	+1.0	1.414	-3.211	7.884	13	13	0	6	1	1
						2000 Hour Measurement										
89.1	100.89	113.4	9.404	1.21601	-0.5	+6.6428	+9.9	2.872	+7.127	8.655	14	14	4	1	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Capacitance — Unit: Nanofarads — GROUPS: LIFE - 6

Nominal Value: (100.0) — Lower Limit (90.0) — 200V 125°C

Upper Limit: (110.0)

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
98.3	102.04	107.5	2.379	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
98.4	105.06	108.8	2.361	.98480	-2.6	+3.0266	+6.4	2.721	+2.955	4.308	15	15	0	0	0	0
						500 Hour Measurement										
97.3	103.83	107.3	2.296	.94580	-1.7	-1.2428	-0.4	.4159	-1.183	11.180	14	14	0	0	1	0
						1000 Hour Measurement										
103.0	105.79	109.1	1.433	.38975	+0.6	+1.9571	+9.1	2.108	+1.885	3.474	14	14	0	0	1	0
						2000 Hour Measurement										
102.7	105.30	108.3	1.393	.94498	-1.1	-.4928	-0.1	.3066	-.4658	6.014	14	14	0	0	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Capacitance | Unit: Nanofarads

Nominal Value: (100.0) | Lower Limit (90.0) | GROUPS: LIFE - 6

Upper Limit: (110.0) | 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
89.6	95.10	98.9	3.749	-	-	-	-	-	-	-	12	-	0	1	3	0
						168 Hour Measurement										
93.0	97.16	99.5	2.263	.36447	+1.0	+2.0583	+5.1	2.054	+2.164	3.472	12	12	0	0	3	0
						500 Hour Measurement										
92.9	97.00	99.5	2.272	1.00780	-0.2	-.0272	+0.3	.1612	-0.028	0.559	11	11	0	0	4	0
						1000 Hour Measurement										
94.1	98.01	100.5	2.356	1.07497	+0.9	+1.1900	+1.5	.2074	+1.227	18.147	10	10	0	0	4	1
						2000 Hour Measurement										
93.6	97.50	100.1	2.295	.94936	-0.8	-.5100	-0.3	.1581	-.5203	10.200	10	10	0	0	5	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (10.0) Lower Limit (9.0) GROUPS: LIFE - 6

Upper Limit: (11.0) 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
9.63	10.040	10.32	.2273	-	-	-	-	-	-	-	11	-	0	0	4	0
						168 Hour Measurement										
9.62	10.164	10.65	.3831	2.84126	-.16	+.12454	+.33	.1797	+1.240	2.299	11	11	0	0	4	0
						500 Hour Measurement										
9.59	10.121	10.56	.3775	.97063	-.10	-.04272	-.01	.0310	-0.420	4.573	11	11	0	0	4	0
						1000 Hour Measurement										
9.66	10.202	10.66	.3827	1.02815	+.05	+.08090	+.15	.0361	+0.080	7.442	11	11	0	0	4	0
						2000 Hour Measurement										
9.59	10.146	10.59	.3818	.99508	-0.11	-.05636	-0.02	.03347	-.5524	5.585	11	11	0	0	4	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter: Capacitance
Unit: Nanofarads
Nominal Value: (100.0)
Lower Limit (90.0)
Upper Limit: (110.0)
GROUPS: LIFE - 6
200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
90.2	96.91	107.2	5.121	-	-	-	-	-	-	-	15	-	0	0	0	0
						168 Hour Measurement										
90.6	97.86	106.5	4.914	.92069	-3.1	+.9466	+5.2	3.049	+0.977	1.202	15	15	0	0	0	0
						500 Hour Measurement										
90.7	97.91	109.1	4.973	1.02414	-1.7	+.0533	+2.6	1.141	+0.054	0.179	15	15	0	0	0	0
						1000 Hour Measurement										
92.9	99.29	110.5	4.863	.95600	+0.3	+1.3800	+3.3	.7141	+1.409	7.484	15	15	1	0	0	0
						2000 Hour Measurement										
92.9	98.83	109.9	4.779	.96608	-1.1	-.4600	+0.5	.4099	-.4633	4.346	15	15	0	0	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Capacitance Unit: Nanofarads

Nominal Value: (100.0) Lower Limit: (90.0) GROUPS: LIFE - 6

Upper Limit: (110.0) 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Nr	Nu	Nl	Nc	Nt
						Initial Measurement										
85.9	**94.82**	**103.8**	**6.658**	-	-	-	-	-	-	-	12	-	0	5	3	0
						168 Hour Measurement										
93.6	99.34	109.0	4.528	.94430	-5.3	+3.7090	+10.7	5.207	+3.912	2.362	11	11	0	0	4	0
						500 Hour Measurement										
92.5	98.78	108.7	4.560	1.01439	-1.1	-.5636	+0.3	.4960	-0.567	3.769	11	11	0	0	4	0
						1000 Hour Measurement										
95.1	100.37	106.3	3.597	.62226	-12.5	+1.1600	+3.0	4.818	+1.174	0.761	10	10	0	0	5	0
						2000 Hour Measurement										
93.5	**100.30**	**109.8**	**4.604**	**1.63794**	**-2.1**	-.0700	+13.6	4.817	-.0697	.0447	10	10	0	0	5	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - MC605104RK

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.0 percent **Lower Limit** None **GROUPS:** Life - 1

Upper Limit: 2.0 percent 50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.48	.790	1.51	.1841	-	-	-	-	-	-	-	75	-	0	-	0	0
						168 Hour Measurement										
.58	.760	1.04	.1202	.42680	-.55	-.03026	+.20	.1449	-3.830	1.809	75	75	0	-	0	0
						500 Hour Measurement										
.60	.768	1.01	.1150	.91493	-.09	-.01027	+.10	.0443	-1.351	1.995	74	74	0	-	1	0
						1000 Hour Measurement										
.92	1.134	1.42	.1230	1.14285	+.23	+.36581	+.51	.0536	+47.632	58.709	74	74	0	-	1	0
						2000 Hour Measurement										
.80	1.068	1.45	.1612	1.71957	-.30	-.06418	+.15	.0885	-5.660	6.235	74	74	0	-	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.0 percent **Lower Limit** None **GROUPS:** LIFE - 1

Upper Limit: 2.0 percent 50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.46	.565	.76	.0724	-	-	-	-	-	-	-	69	-	0	-	6	0
						168 Hour Measurement										
.48	.534	.94	**.0536**	.54770	-.23	-.03086	+.30	.2737	-5.462	**.9366**	69	69	0	-	6	0
						500 Hour Measurement										
.49	.533	.60	.0190	.12543	-.38	-.00161	+.05	.0497	-0.301	0.266	68	68	0	-	6	1
						1000 Hour Measurement										
.55	.603	.93	.0549	8.36110	+.01	+.07076	+.29	.0527	+13.276	10.820	65	65	0	-	8	2
						2000 Hour Measurement										
.54	**.600**	**.90**	**.0496**	**.81727**	-.08	+.00600	+.27	.1356	+0.995	**3.427**	60	60	0	-	12	3

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 1

Upper Limit: 2.5 percent 50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.29	1.615	2.40	.1667	-	-	-	-	-	-	-	72	-	0	-	3	0
						168 Hour Measurement										
1.37	1.552	1.72	.0794	.22706	-.88	-.06626	+.12	.1618	-4.103	3.352	67	67	0	-	8	0
						500 Hour Measurement										
1.41	1.596	1.79	.0802	1.01901	-.03	+.04417	+.16	.0308	+2.846	11.730	67	67	0	-	8	0
						1000 Hour Measurement										
1.52	1.743	2.00	.0913	1.29548	-.08	+.14761	+.25	.0529	+9.249	22.834	67	67	0	-	8	0
						2000 Hour Measurement										
1.35	1.544	1.73	.0813	.79351	-.31	-.20031	+.05	.1863	-11.492	8.534	63	63	0	-	12	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 1

Upper Limit: 2.5 percent 50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.47	.592	.80	.0738	-	-	-	-	-	-	-	69	-	0	-	6	0
						168 Hour Measurement										
.52	.576	.83	.0446	.36513	-.15	-.01057	+.21	.0703	-1.785	1.249	69	69	0	-	6	0
						500 Hour Measurement										
.52	.570	.63	.0261	.34170	-.30	-.00623	+.08	.0449	-1.082	1.151	69	69	0	-	6	0
						1000 Hour Measurement										
.53	.619	.68	.0330	1.60294	-.05	+.04927	+.11	.0259	+8.644	15.811	69	69	0	-	6	0
						2000 Hour Measurement										
.56	.635	.77	.0341	1.06422	-.03	+.01544	+.05	.0648	+2.494	1.965	68	68	0	-	7	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 1

Upper Limit: 2.5 percent 50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.46	.573	.97	.0956	-	-	-	-	-	-	-	66	-	0	-	9	0
						168 Hour Measurement										
.51	.543	.89	.0480	.25164	-.43	-.02920	+.41	.1130	-5.096	2.052	63	63	0	-	10	2
						500 Hour Measurement										
.49	.531	.57	.0141	.08695	-.03	-.00459	+.02	.0126	-0.845	2.834	61	61	0	-	11	3
						1000 Hour Measurement										
.55	.592	.63	.0173	1.55000	+.03	+.05966	+.11	.0288	+11.235	15.906	59	59	0	-	13	3
						2000 Hour Measurement										
.55	.606	.67	.0256	2.09677	-.05	+.01406	+.07	.0700	+2.375	1.543	59	59	0	-	16	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103 V-LAM

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE -- 1

Upper Limit: 2.5 percent 50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.27	1.569	1.27	1.5907	-	-	-	-	-	-	-	60	-	0	-	14	1
						168 Hour Measurement										
1.28	1.372	1.64	.0529	.00110	-.90	-.23945	+.08	.2876	-15.261	6.174	55	55	0	-	15	5
						500 Hour Measurement										
1.29	1.382	1.62	.0447	.71428	-.12	+.00925	+.14	.0411	+0.674	1.653	54	54	0	-	15	6
						1000 Hour Measurement										
1.30	1.383	1.48	.0321	.51500	-.12	+.00979	+.07	.0315	+0.708	2.155	48	48	0	-	15	12
						2000 Hour Measurement										
1.35	1.430	1.52	.0285	.78640	.00	+.04787	+.15	.0849	+3.461	3.866	47	47	0	-	28	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 3.0 percent **Lower Limit** None **GROUPS:** LIFE - 1

Upper Limit: 3.0 percent 50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.32	1.706	2.70	.2587	-	-	-	-	-	-	-	74	-	1	-	1	0
						168 Hour Measurement										
1.30	1.536	2.32	.1985	.58878	-.95	-.16541	+.36	.2254	-9.696	6.227	72	72	0	-	3	0
						500 Hour Measurement										
1.27	1.457	1.97	.1651	.69230	-.38	-.07875	+.11	.0949	-5.127	7.040	72	72	0	-	3	0
						1000 Hour Measurement										
1.32	1.476	1.90	.1439	.75980	-.47	+.01861	+.14	.0903	+1.277	1.748	72	72	0	-	3	0
						2000 Hour Measurement										
1.30	1.477	1.95	.1524	1.11969	-.25	+.00014	+.40	.2322	+.0095	0.000	70	70	0	-	5	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 1

Upper Limit: 2.5 percent 50V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.48	.600	.89	.1322	-	-	-	-	-	-	-	27	-	0	-	48	0
						168 Hour Measurement										
.59	.658	.88	.0686	.26960	-.17	+.05346	+.14	.0939	+8.910	2.902	26	26	0	-	49	0
						500 Hour Measurement										
.56	.625	.91	.0752	1.20169	-.16	-.03384	+.22	.0657	-5.143	2.625	26	26	0	-	49	0
						1000 Hour Measurement										
.68	.737	.95	.0584	.60247	+.04	+.11307	+.16	.0889	+18.120	6.485	26	26	0	-	49	0
						2000 Hour Measurement										
.66	.753	.87	.0447	.58651	-.14	+.01653	+.08	.1414	+2.243	.5961	26	26	0	-	49	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - MC605104RK

Parameter: Percent Dissipation **Unit:** DF x 100 -

Nominal Value: Less than 2.0 percent **Lower Limit** None **GROUPS:** LIFE - 2

Upper Limit: 2.0 percent 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.48	.700	.93	.1444	-	-	-	-	-	-	-	15	-	0	-	0	0
						168 Hour Measurement										
.73	.850	1.31	.1459	1.02207	-.04	+.15066	+.54	.1695	+21.523	3.442	15	15	0	-	0	0
						500 Hour Measurement										
.62	.723	.92	.0943	.41737	-.39	-.12733	-.06	.0918	-14.980	5.374	15	15	0	-	0	0
						1000 Hour Measurement										
.86	1.008	1.37	.1516	2.58492	+.12	+.28466	+.45	.0951	+39.372	11.595	15	15	0	-	0	0
						2000 Hour Measurement										
.95	**1.162**	**1.45**	**.1400**	.85291	+.05	+.15466	+.30	.2581	+15.343	**2.321**	15	15	0	-	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM ELECTRO RESEARCH CAPACITORS - CK2R10[illegible]K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.0 percent Lower Limit None **GROUPS:** LIFE - 2

Upper Limit: 2.0 percent 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.45	.562	.72	.0701	-	-	-	-	-	-	-	15	-	0	-	0	0
						168 Hour Measurement										
.54	.568	.59	.0161	.05284	-.14	+.00533	+.11	.0677	+0.948	0.303	15	15	0	-	0	0
						500 Hour Measurement										
.52	.542	.56	.0105	.42307	-.04	-.02769	-.02	.0114	-4.875	8.756	13	13	0	-	2	0
						1000 Hour Measurement										
.50	.587	.62	.0335	.18181	-.04	+.04500	+.08	.0322	+8.303	4.834	12	12	0	-	2	1
						2000 Hour Measurement										
.62	.654	.68	.0241	.51785	+.04	+.06800	+.13	.0900	+11.584	2.389	10	10	0	-	5	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CK16M104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 2

Upper Limit: 2.5 percent 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.48	.656	1.32	.2132	-	-	-	-	-	-	-	14	-	0	-	1	0
						168 Hour Measurement										
.57	.627	.67	.0359	.02838	-.65	-.02857	+.17	.1984	-4.355	0.539	14	14	0	-	1	0
						500 Hour Measurement										
.54	.568	.63	.0261	.52713	-.11	-.05692	-.03	.0261	-9.078	7.870	13	13	0	-	1	1
						1000 Hour Measurement										
.60	.636	.70	.0332	1.61764	+.03	+.06846	+.13	.0330	+12.053	7.476	13	13	0	-	1	1
						2000 Hour Measurement										
.65	.719	.80	.0360	1.17272	+.05	+.08083	+.12	.0866	+12.709	3.233	12	12	0	-	3	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 2

Upper Limit: 2.5 percent 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	Mo	My	Mu	Nl	Nc	Nt
						Initial Measurement										
1.43	1.660	2.04	.1840	-	-	-	-	-	-	-	14	-	1	-	1	0
						168 Hour Measurement										
1.44	1.532	1.65	.0564	.09391	-.54	-.12230	+.08	.1989	-7.367	2.217	13	13	0	-	2	0
						500 Hour Measurement										
1.47	1.568	1.65	.0540	.91823	+.01	+.03250	+.07	.0217	+2.121	5.193	12	12	0	-	3	0
						1000 Hour Measurement										
1.54	1.610	1.67	.0482	.79452	-.01	+.04636	+.11	.0346	+2.957	4.439	11	11	0	-	3	1
						2000 Hour Measurement										
1.40	1.528	1.60	.0645	1.78879	-.15	-.08181	-.03	.1153	-5.081	2.353	11	11	0	-	4	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 2

Upper Limit: 2.5 percent 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.48	.601	.73	.0689	-	-	-	-	-	-	-	15	-	0	-	0	0
						168 Hour Measurement										
.55	.602	.66	.0300	.18987	-.10	+.00066	+.12	.0685	+0.110	0.032	15	15	0	-	0	0
						500 Hour Measurement										
.53	.604	.67	.0330	1.21111	-.02	+.00266	+.04	.0182	+0.442	0.567	15	15	0	-	0	0
						1000 Hour Measurement										
.55	.594	.62	.0219	.44036	-.07	-.01066	+.04	.0300	-1.705	1.376	15	15	0	-	0	0
						2000 Hour Measurement										
.60	.658	.72	.0398	3.29166	+.02	+.06466	+.12	.0995	+10.886	2.458	15	15	0	-	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 2

Upper Limit: 2.5 percent 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.47	1.798	2.17	.3077	-	-	-	-	-	-	-	12	-	0	-	3	0
						168 Hour Measurement										
1.53	1.637	1.76	.0693	.05068	-.51	-.16083	+.15	.2543	-8.945	2.190	12	12	0	-	3	0
						500 Hour Measurement										
1.52	1.578	1.63	.0371	.28750	-.14	-.08777	-.05	.0318	-5.362	8.285	9	9	0	-	6	0
						1000 Hour Measurement										
1.63	1.673	1.73	.0333	.80434	+.02	+.09250	+.16	.0495	+5.862	5.286	8	8	0	-	7	0
						2000 Hour Measurement										
1.80	1.810	1.82	.0141	.18018	+.12	+.12500	+.13	.0224	+7.472	7.892	2	2	0	-	13	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 2

Upper Limit: 2.5 percent 50V 125°C

Min	Mean	Max	Std	F'	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.47	.554	.68	.0734	-	-	-	-	-	-	-	12	-	0	-	3	0
						168 Hour Measurement										
.54	.562	.61	.0212	.08348	-.07	+.00833	+.10	.0736	+1.504	0.391	12	12	0	-	3	0
						500 Hour Measurement										
.52	.551	.57	.0111	.57777	-.04	-.01083	+.03	.0197	-1.927	1.899	12	12	0	-	3	0
						1000 Hour Measurement										
.53	.566	.62	.0310	3.69230	-.02	+.01636	+.06	.0265	+2.969	2.051	11	11	0	-	3	1
						2000 Hour Measruement										
.62	.641	.65	.0136	.18750	+.03	+.0833	+.11	.0741	+14.723	3.374	9	9	0	-	6	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS : VL02BK103 V-LAM

Parameter: Percent Dissipation Unit: DF x 100

Nominal Value: Less than 2.5 percent Lower Limit None GROUPS: LIFE - 2

Upper Limit: 2.5 percent 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.31	1.653	2.13	.2873	-	-	-	-	-	-	-	13	-	0	-	2	0
						168 Hour Measurement										
1.35	1.411	1.45	.0378	.01732	-.68	-.25750	+.08	.2878	-15.578	3.100	12	12	0	-	2	1
						500 Hour Measurement										
1.32	1.377	1.47	.0460	1.48251	-.10	-.03416	+.06	.0503	-2.421	2.352	12	12	0	-	2	1
						1000 Hour Measurement										
1.27	1.344	1.50	.0559	1.47641	-.12	-.03333	+.03	.0476	-2.420	2.423	12	12	0	-	2	1
						2000 Hour Measurement										
1.35	1.408	1.45	.0289	.26517	-.08	+.06636	+.11	.1679	+4.938	1.311	11	11	0	-	4	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter: Percent Dissipation Unit: DF x 100

Nominal Value: Less than 3.0 percent Lower Limit: None GROUPS: LIFE - 2

Upper Limit: 3.0 percent 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.29	1.634	2.33	.2758	-	-	-	-	-	-	-	15	-	0	-	0	0
						168 Hour Measurement										
1.36	1.588	1.97	.1881	.46528	-.21	+.01461	+.60	.2204	+0.894	0.239	13	13	0	-	1	1
						500 Hour Measurement										
1.28	1.469	1.97	.2167	1.32768	-.24	-.11923	-.01	.0865	-7.508	4.967	13	13	0	-	1	1
						1000 Hour Measurement										
1.25	1.462	1.85	.1728	.63572	-.47	-.03857	+.08	.1332	-2.626	1.083	14	13	0	-	1	0
						2000 Hour Measurement										
1.40	1.554	2.00	.1836	1.12826	+.03	+.09769	+.17	.1500	+6.728	2.348	13	13	0	-	2	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Percent Dissipation Unit: DF x 100

Nominal Value: Less than 2.5 percent Lower Limit None GROUPS: LIFE - 2

Upper Limit: 2.5 percent 50V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.45	.638	,86	-	-	-	-	-	-	-	-	6	-	0	-	9	0
						168 Hour Measurement										
.56	.646	.85	.1071	.37195	-.20	+.00833	+.13	.1180	+1.306	0.170	6	6	0	-	9	0
						500 Hour Measurement										
.60	.636	.69	.0326	.09249	-.19	-.01000	+.07	.0914	-1.548	0.266	6	6	0	-	9	0
						1000 Hour Measurement										
.63	.700	.80	.0636	3.81132	+.02	+.06333	+.17	+.0557	+9.958	2.786	6	6	0	-	9	0
						2000 Hour Measurement										
.72	.778	.82	.0371	.33910	-.08	+.07833	+.17	.2737	+11.190	.7010	6	6	0	-	9	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - MC605104RK

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.0 percent **Lower Limit** None **GROUPS:** LIFE- 3

Upper Limit: 2.0 percent 100V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.52	.804	1.06	.1525	-	-	-	-	-	-	-	15	-	0	-	0	0
						168 Hour Measurement										
.65	.810	.98	.1007	.43655	-.21	+.00600	+.17	.1199	+0.746	0.192	15	15	0	-	0	0
						500 Hour Measurement										
.56	.697	.86	.0943	.87586	-.32	-.12533	-.04	.0752	-15.473	6.452	15	15	0	-	0	0
						1000 Hour Measurement										
.87	1.031	1.24	.0957	1.02924	+.27	+.03400	+.44	.0471	+47.920	27.455	15	15	0	-	0	0
						2000 Hour Measurement										
.85	1.080	1.30	.1084	1.28306	-.05	+.04933	+.12	.1556	+4.785	1.228	15	15	0	-	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Percent Dissipation Unit: DF x 100

Nominal Value: Less than 2.0 percent Lower Limit None GROUPS: LIFE - 3

Upper Limit: 2.0 percent 100 V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.47	.563	.63	.0689	-	-	-	-	-	-	-	13	-	0	-	2	0
						168 Hour Measurement										
.52	.543	.66	.0381	.30526	-.11	-.02000	+.19	.0877	-3.552	0.822	13	13	0	-	2	0
						500 Hour Measurement										
.52	.536	.57	.0157	.17241	-.14	-.00692	+.05	.0451	-1.274	0.553	13	13	0	-	2	0
						1000 Hour Measurement										
.52	.550	.68	.0447	8.0000	-.02	+.01636	+.15	.0465	+3.052	1.167	11	11	0	-	3	1
						2000 Hour Measurement										
.55	.583	.62	.0245	.30000	+.02	+.04600	+.07	.0632	+8.364	2.302	10	9	0	-	4	1

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CK16M104K

Parameter: Percent Dissipation Unit: DF x 100

Nominal Value: Less than 2.5 percent Lower Limit None GROUPS: LIFE - 3

Upper Limit: 2.5 percent 100 V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.48	.675	1.13	.1672	-	-	-	-	-	-	-	13	-	0	-	1	1
						168 Hour Measurement										
.53	.585	.65	.0435	.06747	-.49	-.09000	+.09	.1576	-13.333	2.059	13	13	0	-	1	1
						500 Hour Measurement										
.56	.605	.68	.0407	.87830	-.01	+.02000	+.05	.0176	+3.419	4.096	13	13	0	-	1	1
						1000 Hour Measurement										
.55	.643	.75	.0559	1.87951	-.02	+.03346	+.10	.0321	+6.357	4.321	13	13	0	-	2	0
						2000 Hour Measurement										
.55	.676	.76	.0629	1.26602	-.07	+.01230	+.10	.1371	+5.023	.8495	13	13	0	-	2	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Percent Dissipation — Unit: DF x 100

Nominal Value: Less than 2.5 percent — Lower Limit: None — GROUPS: LIFE - 3

Upper Limit: 2.5 percent — 100 V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.43	1.686	2.36	.2638	-	-	-	-	-	-	-	14	-	0	-	1	0
						168 Hour Measurement										
1.46	1.534	1.72	.0840	.10143	-.66	-.16461	+.15	.2349	-9.763	2.526	13	13	0	-	2	0
						500 Hour Measurement										
1.49	1.600	1.82	.0911	1.17563	+.03	+.06615	+.10	.0244	+4.312	10.666	13	13	0	-	2	0
						1000 Hour Measurement										
1.55	1.652	1.86	.0909	.99518	-.01	+.05153	+.13	.0362	+3.221	5.133	13	13	0	-	2	0
						2000 Hour Measurement										
1.45	1.562	1.73	.0724	.63317	-.15	-.09000	-.03	.1315	-5.448	2.468	13	13	0	-	2	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 3

Upper Limit: 2.5 percent 100 V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.48	.607	.72	.0780	-	-	-	-	-	-	-	14	-	0	-	1	0
						168 Hour Measurement										
.52	.575	.78	.0647	.68801	-.17	-.03142	+.10	.0774	-5.176	1.519	14	14	0	-	1	0
						500 Hour Measurement										
.53	.582	.66	.0392	.36754	-.12	+.00642	+.05	.0429	+1.117	0.559	14	14	0	-	1	0
						1000 Hour Measurement										
.53	.592	.65	.0362	.85064	-.06	+.01071	+.04	.0243	+1.840	1.650	14	14	0	-	1	0
						2000 Hour Measurement										
.55	.621	.66	.0376	1.07633	.00	+.02857	+.05	.0500	+4.826	2.138	14	14	0	-	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter:	Percent Dissipation	**Unit:**	DF x 100		
Nominal Value:	Less than 2.5 percent	**Lower Limit**	None	**GROUPS:**	LIFE - 3
Upper Limit:	2.5 percent				100 V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.43	1.773	2.18	.2842	-	-	-	-	-	-	-	13	-	0	-	2	0
						168 Hour Measurement										
1.37	1.463	1.56	.0571	.04036	-.62	-.2210	-.02	.2203	-12.465	3.172	10	10	0	-	5	0
						500 Hour Measurement										
1.39	1.483	1.55	.0558	.95398	-.04	+.02000	+.08	.0391	+1.367	1.617	10	10	0	-	5	0
						1000 Hour Measurement										
1.50	1.604	1.70	.0712	1.63002	+.05	+.12100	+.19	.0453	+8.159	8.451	10	10	0	-	5	0
						2000 Hour Measurement										
1.55	1.621	1.67	.0560	.61735	-.03	+.01833	+.05	.1044	+1.143	.4301	6	6	0	-	9	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103K V-LAM

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 3

Upper Limit: 2.5 percent 100 V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.46	.583	.71	.0926	-	-	-	-	-	-	-	14	-	0	-	1	0
						168 Hour Measurement										
.50	.523	.54	.0117	.01633	-.19	-.06000	+.06	.0922	-10.292	2.435	14	14	0	-	1	0
						500 Hour Measurement										
.52	.543	.57	.0137	1.35714	+.01	+.02153	+.04	.0118	+4.116	6.561	13	13	0	-	2	0
						1000 Hour Measurement										
.53	.564	.60	.0210	2.31578	-.01	+.02076	+.06	.0179	+3.823	4.184	13	13	0	-	2	0
						2000 Hour Measurement										
.56	.595	.62	.0178	.70454	.00	+.02833	+.06	.0548	+5.023	1.791	12	12	0	-	3	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter: Percent Dissipation

Unit: DF x 100

Nominal Value: Less than 3.0 percent

Lower Limit None

GROUPS: LIFE - 3

Upper Limit: 3.0 percent

100 V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.35	1.644	2.08	.2106	-	-	-	-	-	-	-	15	-	0	-	0	0
						168 Hour Measurement										
1.23	1.443	1.80	.1664	.62457	-.53	-.19615	+.03	.1811	-11.931	3.905	13	13	0	-	2	0
						500 Hour Measurement										
1.21	1.423	1.72	.1612	.93754	-.08	-.02000	+.05	.0401	-1.386	1.797	13	13	0	-	2	0
						1000 Hour Measurement										
1.20	1.396	1.70	.1544	.91798	-.17	-.0279	+.14	.0778	-1.946	1.283	13	13	0	-	2	0
						2000 Hour Measurement										
1.25	1.441	1.72	.1573	1.07969	-.03	+.04166	+.12	.1249	+2.984	1.155	12	12	0	-	3	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 3

Upper Limit: 2.5 percent 100 V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.48	.744	1.29	.3254	-	-	-	-	-	-	-	7	-	0	-	8	0
						168 Hour Measurement										
.54	.655	.95	.1511	.21556	-.44	-.08857	+.15	.2282	-11.905	1.027	7	7	0	-	8	0
						500 Hour Measurement										
.57	.660	.77	.0757	.25109	-.18	+.00428	+.07	.0887	+0.653	0.126	7	7	0	-	8	0
						1000 Hour Measurement										
.54	.708	.82	.0868	1.31588	-.07	+.04857	+.15	.0760	+7.359	1.690	7	7	0	-	8	0
						2000 Hour Measurement										
.68	.737	.82	.0457	.27718	-.07	+.02857	+.14	.2124	+4.035	.3559	7	7	0	-	8	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - MC605104RK

Parameter:	Percent Dissipation	Unit:	DF x 100		
Nominal Value:	Less than 2.0 percent	Lower Limit	None	GROUPS:	LIFE - 4
Upper Limit:	2.0 percent				100 V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.53	.794	1.12	.1459	-	-	-	-	-	-	-	15	-	0	-	0	0
						168 Hour Measurement										
.71	.829	1.12	.1069	.53640	-.25	+.03533	+.21	.1425	+4.450	0.960	15	15	0	-	0	0
						500 Hour Measurement										
.76	.850	.96	.0712	.44395	-.24	+.02133	+.08	.0756	+2.573	1.093	15	15	0	-	0	0
						1000 Hour Measurement										
.83	1.014	1.15	.0912	1.63905	+.06	+.16333	+.21	.0407	+19.215	15.526	15	15	0	-	0	0
						2000 Hour Measurement										
1.05	1.254	1.45	.1252	1.88567	+.13	+.23571	+.30	.1565	+23.246	5.636	14	14	0	-	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.0 percent **Lower Limit** None **GROUPS:** LIFE - 4

Upper Limit: 2.0 percent 100 V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	Np	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.44	.542	.61	.0598	-	-	-	-	-	-	-	13	-	0	-	2	0
						168 Hour Measurement										
.51	.546	.57	.0170	.08100	-.06	+.00916	+.08	.0521	+1.690	0.609	12	12	0	-	2	1
						500 Hour Measurement										
.50	.524	.53	.0089	.27586	-.04	-.02250	-.01	.0105	-4.121	7.431	12	12	0	-	2	1
						1000 Hour Measurement										
.52	.572	.81	.0797	9.4999	+.02	+.05909	+.28	.0764	+11.277	2.564	11	10	0	-	4	0
						2000 Hour Measurement										
.57	.632	.66	.0282	.12421	-.15	+.04600	+.11	.2328	+7.904	.6249	10	10	0	-	5	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITROS - CK16M104K

Parameter: Percent Dissipation **Unit:** DF x 100 **GROUPS:** LIFE - 4

Nominal Value: Less than 2.5 percent Lower Limit None 100 V 125°C

Upper Limit: 2.5 percent

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt:
						Initial Measurement										
.50	.620	.80	.2638	-	-	-	-	-	-	-	14	-	0	-	1	0
						168 Hour Measurement										
.57	.610	.66	.0245	.06396	-.17	-.01000	+.11	.0937	-1.613	0.399	14	14	0	-	1	0
						500 Hour Measurement										
.54	.563	.62	.0224	.83333	-.07	-.04642	-.02	.0148	-7.610	11.710	14	14	0	-	1	0
						1000 Hour Measurement										
.57	.601	.64	.0212	.90000	+.02	+.03785	+.06	.0118	+6.723	11.969	14	14	0	-	1	0
						2000 Hour Measurement										
.62	.687	.73	.0324	2.33333	+.05	+.08571	+.13	.0889	+14.261	3.607	14	14	0	-	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 4

Upper Limit: 2.5 percent 100 V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.43	1.693	2.30	.2638	-	-	-	-	-	-	-	13	-	0	-	2	0
						168 Hour Measurement										
1.40	1.590	2.36	.2541	.92801	-.66	-.08666	+.12	.2208	-5.119	1.359	12	12	0	-	3	0
						500 Hour Measurement										
1.36	1.515	1.65	.0996	.15373	-1.00	-.07583	+.04	.2918	-4.769	0.900	12	12	0	-	3	0
						1000 Hour Measurement										
1.40	1.590	1.72	.0992	.99093	+.01	+.06909	+.26	.0668	+4.560	3.431	11	11	0	-	4	0
						2000 Hour Measurement										
1.35	1.491	1.60	.0854	.73983	-.13	-.11222	-.06	.1068	-7.058	3.152	9	9	0	-	6	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Percent Dissipation
Unit: DF x 100
Nominal Value: Less than 2.5 percent
Lower Limit None
Upper Limit: 2.5 percent
GROUPS: LIFE - 4
100 V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.51	.599	.76	.0766	-	-	-	-	-	-	-	14	-	0	-	1	0
						168 Hour Measurement										
.48	.555	.61	.0333	.18941	-.19	-.04428	+.05	.0697	-7.392	2.379	14	14	0	-	1	0
						500 Hour Measurement										
.48	.525	.55	.0202	.36936	-.07	-.03230	+.04	.0275	-5.820	4.252	13	13	0	-	2	0
						1000 Hour Measurement										
.52	.563	.60	.0274	1.82926	+.02	+.03769	+.08	.0202	+7.179	6.711	13	13	0	-	2	0
						2000 Hour Measurement										
.60	.648	.70	.0288	1.10666	+.04	+.08538	+.12	.0781	+15.165	3.942	13	13	0	-	2	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Percent Dissipation Unit: DF x 100

Nominal Value: Less than 2.5 percent Lower Limit None GROUPS: LIFE - 4

Upper Limit: 2.5 percent 100 V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.45	1.900	2.68	.4173	-	-	-	-	-	-	-	13	-	2	-	2	0
						168 Hour Measurement										
1.47	1.531	1.60	.0416	.00993	-1.15	-.3744	-.02	.4322	-19.707	2.599	9	9	0	-	6	0
						500 Hour Measurement										
1.35	1.400	1.47	.0559	1.80924	-.15	-.13250	-.11	.0170	-8.654	15.561	4	4	0	-	11	0
						1000 Hour Measurement										
-	-	-	-	-	-	-	-	-	-	-	0	0	-	-	15	0
						2000 Hour Measurement										
-	-	-	-	-	-	-	-	-	-	-	0	0	-	-	15	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Percent Dissipation Unit: DF x 100

Nominal Value: Less than 2.5 percent Lower Limit None GROUPS: LIFE - 4

Upper Limit: 2.5 percent 100 V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.47	.590	.92	.0976	-	-	-	-	-	-	-	12	-	0	-	3	0
						168 Hour Measurement										
.50	.536	.61	.0315	.00010	-.38	-.05333	+.13	.1321	-9.039	1.399	12	12	0	-	3	0
						500 Hour Measurement										
.50	.526	.60	.0263	.69000	-.05	-.01000	+.01	.0164	-1.866	2.108	12	12	0	-	3	0
						1000 Hour Measurement										
.52	.549	.58	.0219	.69565	-.03	+.02181	+.08	.0336	+4.146	2.152	11	11	0	-	4	0
						2000 Hour Measurement										
.57	.669	1.12	.1598	3.20833	+.04	.12300	+.55	.4789	+22.404	.8122	10	10	0	-	5	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS -VL02BK103K V-LAM

Parameter: Percent Dissipation — Unit: DF x 100

Nominal Value: Less than 2.5 percent — Lower Limit: None — GROUPS: LIFE - 4

Upper Limit: 2.5 percent — 100 V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.33	1.527	2.68	.5508	-	-	-	-	-	-	-	14	-	1	-	1	0
						168 Hour Measurement										
1.36	1.423	1.89	.1424	.06080	-.79	-.21923	+.04	.2417	-14.357	3.271	13	13	0	-	1	1
						500 Hour Measurement										
1.32	1.346	1.41	.0290	.04144	-.08	-.03750	+.04	.0330	-2.635	3.935	12	12	0	-	2	1
						1000 Hour Measurement										
1.28	1.324	1.38	.0293	1.02380	-.10	-.02454	+.03	.0410	-1.823	1.986	11	11	0	-	2	2
						2000 Hour Measurement										
1.30	1.319	1.38	.0247	.69767	-.08	-.00545	+.06	.1140	-.4116	.1586	11	11	0	-	4	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 3.0 percent **Lower Limit** None **GROUPS:** LIFE - 4

Upper Limit: 3.0 percent 100 V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.29	1.688	2.08	.2435	-	-	-	-	-	-	-	15	-	0	-	0	0
						168 Hour Measurement										
1.35	1.548	1.92	.1629	.44740	-.35	-.06769	+.40	.2306	-4.010	1.058	13	13	0	-	2	0
						500 Hour Measurement										
1.20	1.333	1.54	.1060	.42367	-.72	-.20750	-.10	.1665	-13.404	4.317	12	12	0	-	3	0
						1000 Hour Measurement										
1.20	1.346	1.56	.1094	1.06405	-.05	+.01333	+.07	.0336	+1.000	1.373	12	12	0	-	3	0
						2000 Hour Measurement										
1.17	1.326	1.45	.0829	.57441	-.11	-.02000	+.08	.1517	-1.486	.4567	12	12	0	-	3	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 4

Upper Limit: 2.5 percent 100 V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.46	.606	.96	.1895	-	-	-	-	-	-	-	6	-	0	-	9	0
						168 Hour Measurement										
.62	.646	.72	.0392	.04289	-.34	+.04000	+.19	.1999	+6.601	0.490	6	6	0	-	9	0
						500 Hour Measurement										
.61	.663	.77	.0656	2.79220	-.03	+.01666	+.15	.0674	+2.579	0.605	6	6	0	-	9	0
						1000 Hour Measurement										
.63	.706	.75	.0427	.42325	-.07	+.04333	+.14	.0766	+6.535	1.386	6	6	0	-	9	0
						2000 Hour Measurement										
.57	.620	.68	.0364	.72527	-.15	-.08666	.00	.1806	-12.275	1.175	6	6	0	-	9	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - MC605104RK

Parameter:	Percent Dissipation				**Unit:**	DF x 100											
Nominal Value:	Less than 2.0 percent				**Lower Limit**	None					**GROUPS:**	LIFE - 5					
Upper Limit:	2.0 percent											200 V 85°C					
Min	**Mean**	**Max**	**Std**	**F**	**MinD**	**MeanD**	**MaxD**	**StdD**	**PC**	**t**	**No**	**Ny**	**Nu**	**Nl**	**Nc**	**Nt**	
						Initial Measurement											
.52	.658	1.03	.1330	-	-	-	-	-	-	-	15	-	0	-	0	0	
						168 Hour Measurement											
.61	.682	.86	.0735	.30525	-.17	-.02800	+.13	.0829	-3.944	1.308	15	15	0	-	0	0	
						500 Hour Measurement											
.56	.715	.86	.0697	.90000	-.10	+.03266	+.14	.0593	+4.789	2.132	15	15	0	-	0	0	
						1000 Hour Measurement											
.80	.899	1.10	.0819	1.37860	+.05	+.18400	+.32	.0704	+25.734	10.119	15	15	0	-	0	0	
						2000 Hour Measurement											
.82	.926	1.12	.0879	1.15223	-.04	+.02733	+.07	.0964	+3.040	1.098	15	15	0	--	0	0	

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter:	Percent Dissipation				**Unit:**	DF x 100										
Nominal Value:	Less than 2.0 percent				**Lower Limit**	None					**GROUPS:**	LIFE - 5				
Upper Limit:	2.0 percent											200V 85°C				
Min	**Mean**	**Max**	**Std**	**F**	**MinD**	**MeanD**	**MaxD**	**StdD**	**PC**	**t**	**No**	**Ny**	**Nu**	**Nl**	**Nc**	**Nt**
						Initial Measurement										
.46	.551	.63	.0612	-	-	-	-	-	-	-	12	-	0	-	3	0
						168 Hour Measurement										
.43	.470	.50	.0170	.07754	-.19	-.08166	+.02	.0713	-14.820	3.969	12	12	0	-	2	1
						500 Hour Measurement										
.46	.476	.50	.0126	.55172	-.01	+.00666	+.03	.0161	+1.417	1.430	12	12	0.	-	2	1
						1000 Hour Measurement										
.42	.544	.95	.2041	246.462	-.05	+.07111	+.47	.2026	+14.939	1.053	9	9	0	-	3	3
						2000 Hour Measurement										
.48	.510	.53	.0207	.01008	-.42	+.00375	+.08	.5421	+.6893	.0196	8	8	0	-	7	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CK16M104K

Parameter: Percent Dissipation Unit: DF x 100

Nominal Value: Less than 2.5 percent Lower Limit: None GROUPS: LIFE - 5

Upper Limit: 2.5 percent 200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.50	.658	1.16	.1944	-	-	-	-	-	-	-	14	-	0	-	1	0
						168 Hour Measurement										
.48	.512	.54	.0187	.00926	-.68	-.14642	+.02	.1988	-22.252	2.755	14	14	0	-	1	0
						500 Hour Measurement										
.48	.527	.56	.0205	1.20000	-.02	+.01500	+.04	.0158	+2.930	3.550	14	14	0	-	1	0
						1000 Hour Measurement										
.46	.542	.60	.0348	2.88095	-.03	+.01500	+.06	.0285	+2.846	1.972	14	14	0	-	1	0
						2000 Hour Measurement										
.55	.576	.60	.0214	.37190	-.01	+.02769	+.08	.0872	+5.109	1.145	13	13	0	-	2	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Percent Dissipation Unit: DF x 100

Nominal Value: Less than 2.5 percent Lower Limit None GROUPS: LIFE - 5

Upper Limit: 2.5 Percent 200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.47	1.938	2.58	.3986	-	-	-	-	-	-	-	15	-	0	-	0	0
						168 Hour Measurement										
1.41	1.547	2.00	.1822	.02881	-1.07	-.45538	+.18	.4389	-23.497	3.741	13	13	0	-	2	0
						500 Hour Measurement										
1.42	1.630	2.08	.2275	1.56027	+.01	+.08750	+.26	.0729	+5.656	4.156	12	12	0	-	3	0
						1000 Hour Measurement										
1.38	1.513	1.72	.1221	.28819	-.36	-.07888	+.05	.1225	-4.839	1.931	9	9	0	-	6	0
						2000 Hour Measurement										
1.37	1.465	1.55	.0548	.20107	-.17	-.02500	+.03	.2138	-1.652	.3307	8	8	0	-	7	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter:	Percent Dissipation				Unit:	DF x 100										
Nominal Value:	Less than 2.5 percent				Lower Limit	None				GROUPS:	LIFE - 5 200V 85°C					
Upper Limit:	2.5 percent															
Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.49	.604	.68	.0652	-	-	-	-	-	-	-	15	-	0	-	0	0
						168 Hour Measurement										
.47	.536	.62	.0381	.05094	-.15	-.07333	+.03	.0531	-12.141	5.348	15	15	0	-	0	0
						500 Hour Measurement										
.48	.542	.62	.0416	1.19310	-.05	+.00666	+.05	.0241	+1.243	1.071	15	15	0	-	0	0
						1000 Hour Measurement										
.46	.550	.66	.0557	1.79190	-.04	+.00800	+.17	.0522	+1.476	0.592	15	15	0	-	0	0
						2000 Hour Measurement										
.53	.604	.68	.0463	.69032	-.01	+.05400	+.18	.0423	+9.818	4.943	15	15	0	-	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 5

Upper Limit: 2.5 percent 200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurment										
1.44	1.875	2.50	.3827	-	-	-	-	-	-	-	14	-	0	-	1	0
						168 Hour Measurement										
1.32	1.405	1.53	.0858	.05032	-.88	-.37666	+.06	.3265	-20.089	3.460	9	9	0	-	6	0
						500 Hour Measurement										
1.32	1.398	1.55	.0811	.89280	-.18	-.02142	+.02	.0717	-1.525	0.790	7	7	0	-	7	1
						1000 Hour Measurement										
1.38	1.498	1.61	.0853	1.10486	+.06	+.0880	+.18	.0536	+6.295	3.673	5	4	0	-	10	0
						2000 Hour Measurement										
1.45	1.475	1.50	.0112	.17193	-.11	-.02000	+.07	.4025	-1.335	.0703	2	2	0	-	13	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Percent Dissipation Unit: DF x 100

Nominal Value: Less than 2.5 percent Lower Limit None GROUPS: LIFE - 5 .

Upper Limit: 2.5 percent 200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.32	1.828	2.74	.5075	-	-	-	-	-	-	-	13	-	2	-	2	0
						168 Hour Measurement										
1.32	1.382	1.48	.0458	.00815	-1.37	-.44615	+.04	.4930	-24.406	3.263	13	13	0	-	2	0
						500 Hour Measurement										
1.27	1.389	2.11	.2192	22.876	-.10	+.00692	+.67	.2009	+0.501	0.122	13	13	0	-	2	0
						1000 Hour Measurement										
1.18	1.288	1.42	.0671	.09367	-.11	-.04083	+.10	.0594	-2.940	2.381	12	12	0	-	3	0
						2000 Hour Measurement										
1.26	1.330	1.35	.0309	.21111	-.08	+.04250	+.12	.2114	+3.300	.6964	12	12	0	-	3	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter:	Percent Dissipation			Unit:	DF x 100											
Nominal Value:	Less than 3.0 percent			Lower Limit	None					GROUPS:	LIFE - 5					
Upper Limit:	3.0 percent										200V 85°C					
Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.41	1.730	2.10	.1914	-	-	-	-	-	-	-	15	-	0	-	0	0
						168 Hour Measurement										
1.17	1.462	1.93	.220	1.32150	-.57	-.26800	+.02	.1747	-15.491	5.940	15	15	0	-	0	0
						500 Hour Measurement										
1.12	1.350	1.69	.1936	.77426	-.49	-.10000	+.10	.1366	-6.840	2.738	14	14	0	-	0	1
						1000 Hour Measurement										
1.05	1.270	1.50	.1713	.7823	-.17	-.05384	+.13	.0961	-3.988	2.019	13	13	0	-	1	1
						2000 Hour Measurement										
1.14	1.334	1.57	.1561	.83054	-.18	+.06461	+.12	.2691	+5.087	.8657	13	13	0	-	2	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Percent Dissipation — **Unit:** DF x 100

Nominal Value: Less than 2.5 percent — **Lower Limit** None — **GROUPS:** LIFE - 5

Upper Limit: 2.5 percent — 200V 85°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.46	.646	1.30	.3257	-	-	-	-	-	-	-	6	-	0	-	9	0
						168 Hour Measurement										
.52	.705	1.18	.2466	.57295	-.12	+.05833	+.29	.1430	+9.029	0.999	6	6	0	-	9	0
						500 Hour Measurement										
.57	.720	.98	.1863	.57114	-.25	+.01500	+.15	.1647	+2.128	0.221	6	6	0	-	9	0
						1000 Hour Measurement										
.65	.735	.92	.0942	.25547	-.21	+.01500	+.15	.1387	+2.083	0.265	6	6	0	-	9	0
						2000 Hour Measurement										
.70	.776	.92	.0753	.63810	.00	+.04166	+.08	.0900	+5.668	1.134	6	6	0	-	9	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - MC605104RK

Parameter: Percent Dissipation Unit: DF x 100

Nominal Value: Less than 2.0 percent Lower Limit None GROUPS: LIFE - 6

Upper Limit: 2.0 percent 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.48	.700	.92	.1293	-	-	-	-	-	-	-	15	-	0	-	0	0
						168 Hour Measurement										
.64	.800	.94	.0981	.57630	-.09	+.08714	+.38	.1298	+12.449	2.512	14	14	0	-	1	0
						500 Hour Measurement										
.55	.739	.94	.1196	1.48598	-.17	-.06071	+.02	.0562	-7.589	4.041	14	14	0	-	1	0
						1000 Hour Measurement										
.62	.873	1.27	.2331	3.79664	-.01	+.13428	+.43	.1469	+18.171	3.419	14	14	0	-	1	0
						2000 Hour Measurement										
.73	.913	1.12	.1268	.29596	-.23	+.04000	+.24	.4853	+4.582	0.308	14	14	0	-	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Percent Dissipation — **Unit:** DF x 100

Nominal Value: Less than 2.0 percent — **Lower Limit** None — GROUPS: LIFE - 6

Upper Limit: 2.0 percent — 200 V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.47	.542	.62	.0529	-	-	-	-	-	-	-	13	-	0	-	2	0
						168 Hour Measurement										
.50	.535	.57	.0192	.13214	-.09	-.0050	+.07	.0607	-0.923	0.285	12	12	0	-	3	0
						500 Hour Measurement										
.46	.490	.52	.0202	1.10810	-.08	-.04583	-.01	.0221	-8.566	7.172	12	12	0	-	3	0
						1000 Hour Measurement										
.41	.440	.46	.0148	.53658	-.07	-.04727	-.03	.0148	-9.647	10.570	11	11	0	-	4	0
						2000 Hour Measurement										
.51	.530	.56	.0170	1.27272	+.06	+.09090	+.11	.0678	+20.659	4.447	11	11	0	-	4	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CK16M104K

Parameter: Percent Dissipation Unit: DF x 100

Nominal Value: Less than 2.5 percent Lower Limit None GROUPS: LIFE - 6

Upper Limit: 2.5 percent 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.49	.643	.95	.1468	-	-	-	-	-	-	-	14	-	0	-	1	0
						168 Hour Measurement										
.55	.622	.68	.0445	.09183	-.39	-.02769	+.16	.1737	-4.306	0.574	13	13	0	-	2	0
						500 Hour Measurement										
.51	.579	.65	.0495	1.23737	-.07	-.04307	-.02	.0148	-6.924	10.470	13	13	0	-	2	0
						1000 Hour Measurement										
.43	.593	.71	.1066	4.64081	-.08	+.01384	+.11	.0636	+2.390	0.785	13	13	0	-	2	0
						2000 Hour Measurement										
.55	.602	.66	.0409	.14599	-.07	+.00923	+.12	.2412	+1.556	.1380	13	13	0	-	2	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 6

Upper Limit: 2.5 percent 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.38	1.736	2.63	.4013	-	-	-	-	-	-	-	13	-	1	-	2	0
						168 Hour Measurement										
1.22	1.448	1.83	.1490	.13795	-.98	-.35090	.00	.3327	-20.213	3.498	11	11	0	-	4	0
						500 Hour Measurement										
1.19	1.408	1.80	.1593	1.14227	-.07	-.03800	-.02	.0173	-2.624	6.938	10	10	0	-	5	0
						1000 Hour Measurement										
1.00	1.216	1.46	.1372	.74182	-.34	-.20125	-.13	.0642	-14.293	8.868	8	8	0	-	7	0
						2000 Hour Measurement										
1.05	1.241	1.40	.1123	.68225	+.03	+.06000	+.09	.0728	+4.934	2.181	7	7	0	-	8	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Percent Dissipation **Unit;** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 6

Upper Limit: 2.5 percent 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.48	.605	.86	.1005	-	-	-	-	-	-	-	15	-	0	-	0.	0
						168 Hour Measurement										
.48	.568	.79	.0662	.43409	-.14	-.03733	+.09	.0726	-6.170	1.991	15	15	0	-	0	0
						500 Hour Measurement										
.46	.523	.57	.0316	.22831	-.05	-.02769	-.01	.0168	-4.875	5.966	13	13	0	-	1	1
						1000 Hour Measurement										
.42	.483	.62	.0500	2.50000	-.06	-.04000	+.05	.0283	-7.648	5.099	13	13	0	-	1	1
						2000 Hour Measurement										
.50	.560	.60	.0264	.27600	-.04	+.07500	+.12	.1338	+15.528	2.097	14	14	0	-	1	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 6

Upper Limit: 2.5 percent 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.47	1.860	2.58	.3437	-	-	-	-	-	-	-	13	-	1	-	2	0
						168 Hour Measurement										
1.63	1.784	1.90	.0811	.05560	-.75	-.07615	+.25	.2931	-4.094	0.936	13	13	0	-	2	0
						500 Hour Measurement										
1.55	1.677	1.86	.1165	2.06697	-.23	-.10692	-.01	.0616	-5.993	6.254	13	13	0	-	2	0
						1000 Hour Measurement										
1.75	1.882	2.88	.2782	5.60808	+.01	+.20461	+1.25	.3276	+12.201	2.252	13	13	1	-	2	0
						2000 Hour Measurement										
1.70	1.792	2.27	.1479	.28276	-.53	-.09000	.00	.4548	-4.782	.7135	13	13	0	-	2	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 6

Upper Limit: 2.5 percent 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.47	.555	.64	.0685	-	-	-	-	-	-	-	12	-	0	-	3	0
						168 Hour Measurement										
.53	.552	.57	.0142	.04264	-.08	-.00166	+.09	.0637	-0.299	0.089	12	12	0	-	3	0
						500 Hour Measurement										
.52	.530	.56	.0105	.55000	-.05	-.02166	+.01	.0184	-3.924	4.069	12	12	0	-	3	0
						1000 Hour Measurement										
.57	.605	.67	.0283	7.27272	+.03	+.07400	+.11	.0221	+13.962	10.571	10	10	0	-	3	2
						2000 Hour Measurement										
.54	.558	.60	.0169	.35000	-.13	-.04700	.00	.1122	-7.769	1.325	10	10	0	-	5	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL-2BK103K V-LAM

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 6

Upper Limit: 2.5 percent 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.31	1.617	2.38	.3875	-	-	-	-	-	-	-	11	-	0	-	4	0
						168 Hour Measurement										
1.37	1.444	1.62	.0722	.03477	-1.00	-.17272	+.09	.3816	-10.682	1.501	11	11	0	-	4	0
						500 Hour Measurement										
1.33	1.376	1.57	.0686	.90038	-.12	-.06818	-.02	.0375	-4.722	6.022	11	11	0	-	4	0
						1000 Hour Measurement										
1.30	1.398	1.60	.0884	1.66170	-.04	+.02100	+.13	.0530	+1.526	1.253	10	10	0	-	5	0
						2000 Hour Measurement										
1.32	1.386	1.55	.0682	.59411	-.08	-.01200	+.05	.1546	-.8584	.2455	10	10	0	-	5	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 3.0 percent **Lower Limit** None **GROUPS:** LIFE - 6

Upper Limit: 3.0 percent 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
1.45	1.656	2.20	.1914	-	-	-	-	-	-	-	15	-	0	-	0	0
						168 Hour Measurement										
1.36	1.634	2.74	.3618	3.57400	-.40	-.02133	+1.17	.4085	-1.288	0.200	15	15	0	-	0	0
						500 Hour Measurement										
1.31	1.470	1.84	.1585	.19200	-1.37	-.16400	.00	1.084	-10.037	1.854	15	15	0	-	0	0
						1000 Hour Measurement										
1.37	1.524	1.71	.1493	.88698	-.12	+.05400	+.17	.0602	+3.673	3.476	15	15	0	-	0	0
						2000 Hour Measurement										
1.34	1.458	1.72	.1201	.64782	-.32	-.06666	-.01	.2468	-4.374	1.046	15	15	0	-	0	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Percent Dissipation **Unit:** DF x 100

Nominal Value: Less than 2.5 percent **Lower Limit** None **GROUPS:** LIFE - 6

Upper Limit: 2.5 percent 200V 125°C

Min	Mean	Max	Std	F	MinD	MeanD	MaxD	StdD	PC	t	No	Ny	Nu	Nl	Nc	Nt
						Initial Measurement										
.44	.795	1.76	.4659	-	-	-	-	-	-	-	7	-	0	-	8	0
						168 Hour Measurement										
.53	.721	1.25	.2669	.16072	-.51	-.08000	+.15	.2607	-10.063	0.752	6	6	0	-	9	0
						500 Hour Measurement										
.55	.600	.67	.0518	.03761	-.59	-.12166	+.02	.2321	-16.874	1.285	6	6	0	-	9	0
						1000 Hour Measurement										
.68	.740	.81	.0506	.95522	+.02	+.14000	+.21	.0666	+23.333	5.146	6	6	0	-	9	0
						2000 Hour Measurement										
.58	.618	.67	.0319	.39453	-.16	-.12166	-.05	.1285	-16.441	2.319	6	6	0	-	9	0

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
AEROVOX CAPACITORS - NC605104RK

Parameter: Insulation Leakage

Group: Life - 1
50V 85°C

Min. (K megohms)	No.	Nc
	Initial Measurement	
0.357	67	8
	168 Hour Measurement	
25.641	67	8
	500 Hour Measurement	
27.778	67	8
	1000 Hour Measurement	
23.810	67	8
	2000 Hour Measurement	
21.739	67	8

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Insulation Leakage

Group: Life - 1
50V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
1.904	70	5
	168 Hour Measurement	
111.111	68	7
	500 Hour Measurement	
37.037	67	7
	1000 Hour Measurement	
51.282	64	9
	2000 Hour Measurement	
95.238	57	15

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMB ER 152. 20-02

GULTON CAPACITORS - CK16M104K

Parameter: Insulation Leakage Group: Life - 1

50V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0. 192	68	7
	168 Hour Measurement	
62. 500	63	12
	500 Hour Measurement	
45. 455	63	12
	1000 Hour Measurement	
27. 778	63	12
	2000 Hour Measurement	
33. 333	63	12

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152. 20-02

GULTON CAPACITORS - CN05M105K

Parameter: Insulation Leakage Group: Life - 1
50V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0. 011	67	6
	168 Hour Measurement	
0. 500	61	14
	500 Hour Measurement	
5. 263	61	14
	1000 Hour Measurement	
2. 381	60	14
	2000 Hour Measurement	
2. 564	58	17

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152-20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Insulation Leakage Group: Life - 1

50V 85°C

Min (K megohms)	No	Nc
	Initial Measunement	
0.556	73	2
	168 Hour Measurement	
28.169	72	2
	500 Hour Measurement	
26.316	73	2
	1000 Hour Measurement	
23.810	73	2
	2000 Hour Measurement	
11.905	72	3

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Insulation Leakage Group: Life-1

50V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.045	46	22
	168 Hour Measurement	
15.628	37	38
	500 Hour Measurement	
23.810	34	41
	1000 Hour Measurement	
10.638	34	41
	2000 Hour Measurement	
7.813	33	42

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Insulation Leakage Group: Life-1

50V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.455	61	14
	168 Hour Measurement	
10.526	61	14
	500 Hour Measurement	
1.818	61	14
	1000 Hour Measurement	
1.538	55	15
	2000 Hour Measurement	
5.000	55	20

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Insulation Leakage Group: Life-1
50V85°C

Min (K megohms)	No	Nc
	Initial Measurement	
1.250	69	6
	168 Hour Measurement	
83.33	69	6
	500 Hour Measurement	
68.966	69	6
	1000 Hour Measurement	
86.957	57	6
	2000 Hour Measurement	
12.195	56	19

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
VITRAMON CAPACITORS - VK30BX104K

Parameter: Insulation Leakage

Group: Life-1
50V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.179	74	1
	168 Hour Measurement	
0.071	72	3
	500 Hour Measurement	
3.125	72	3
	1000 Hour Measurement	
1.563	70	5
	2000 Hour Measurement	
2.083	69	6

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
WESTCAP CAPACITORS - B758BX104K

Parameter: Insulation Leakage

Group: Life-1
50V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0. 014	63	12
	168 Hour Measurement	
0. 227	60	15
	500 Hour Measurement	
0. 153	60	15
	1000 Hour Measurement	
0. 153	60	15
	2000 Hour Measurement	
1. 071	59	16

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - NC605104RK

Parameter: Insulation Leakage Group: Life-2

50V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.455	14	1
	168 Hour Measurement	
35.714	14	1
	500 Hour Measurement	
27.778	14	1
	1000 Hour Measurement	
20.000	14	1
	2000 Hour Measurement	
22.727	14	1

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Insulation Leakage Group: Life-2

50V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.182	15	0
	168 Hour Measurement	
0.044	15	0
	500 Hour Measurement	
0.056	15	0
	1000 Hour Measurement	
200.000	13	0
	2000 Hour Measurement	
52.632	12	3

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CK16M104K

Parameter: Insulation Leakage Group: Life-2

50V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.847	13	0
	168 Hour Measurement	
56.818	12	2
	500 Hour Measurement	
40.000	12	3
	1000 Hour Measurement	
32.895	12	3
	2000 Hour Measurement	
35.714	11	4

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Insulation Leakage Group: Life-2

50V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.333	14	1
	168 Hour Measurement	
0.179	12	3
	500 Hour Measurement	
0.357	11	4
	1000 Hour Measurement	
0.213	10	4
	2000 Hour Measurement	
1.250	10	5

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152-20.02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Insulation Leakage Group: Life-2

50V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
3.333	15	0
	168 Hour Measurement	
2.000	15	0
	500 Hour Measurement	
2.851	15	0
	1000 Hour Measurement	
3.846	15	0
	2000 Hour Measurement	
2.500	15	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152. 20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Insulation Leakage Group: Life-2

50V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.172	13	2
	168 Hour Measurement	
0.071	13	2
	500 Hour Measurement	
0.385	10	5
	1000 Hour Measurement	
2.174	8	7
	2000 Hour Measurement	
18.519	2	13

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Insulation Leakage **Group:** Life-2

50V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
6.452	12	3
	168 Hour Measurement	
3.226	12	3
	500 Hour Measurement	
0.143	12	3
	1000 Hour Measurement	
0.049	11	3
	2000 Hour Measurement	
6.667	10	5

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Insulation Leakage Group: Life-2

50V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
17.857	14	1
	168 Hour Measurement	
333.333	13	1
	500 Hour Measurement	
370.370	13	2
	1000 Hour Measurement	
270.270	12	2
	2000 Hour Measurement	
185.185	12	3

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter: Insulation Leakage Group: Life-2

50V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
10.417	14	1
	168 Hour Measurement	
1.563	14	1
	500 Hour Measurement	
0.385	14	1
	1000 Hour Measurement	
0.039	14	1
	2000 Hour Measurement	
8.929	13	2

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Insulation Leakage

Group: Life-2

50V 125°C

Min. (K megohms)	N_O	Nc
	Initial Measurement	
0.042	10	5
	168 Hour Measurement	
6.250	10	5
	500 Hour Measurement	
4.167	10	5
	1000 Hour Measurement	
5.769	10	5
	2000 Hour Measurement	
6.250	10	5

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - NC605104RK

Parameter: Insulation Leakage Group: Life-3

100V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
4.545	14	1
	168 Hour Measurement	
43.478	14	1
	500 Hour Measurement	
33.333	14	1
	1000 Hour Measurement	
45.455	14	1
	2000 Hour Measurement	
29.412	14	1

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Insulation Leakage Group: Life-3

100V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.267	13	2
	168 Hour Measurement	
22.727	13	2
	500 Hour Measurement	
0.200	13	2
	1000 Hour Measurement	
8.333	12	2
	2000 Hour Measurement	
9.091	11	4

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CK16M104K

Parameter: Insulation Leakage

Group: Life-3
100V 85°C

Min. K(megohms)	No	Nc
	Initial Measurement	
0.208	13	2
	168 Hour Measurement	
89.286	13	2
	500 Hour Measurement	
58.824	13	2
	1000 Hour Measurement	
67.568	13	2
	2000 Hour Measurement	
5.263	13	2

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Insulation Leakage Group: Life - 3
100V 85°C

Min. K(megohms)	No	Nc
	Initial Measurement	
0.026	12	3
	168 Hour Measurement	
0.400	10	5
	500 Hour Measurement	
0.625	10	5
	1000 Hour Measurement	
2.381	9	6
	2000 Hour Measurement	
2.500	9	6

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Insulation Leakage Group: Life-3

100V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
2.632	15	0
	168 Hour Measurement	
47.619	15	0
	500 Hour Measurement	
86.957	15	0
	1000 Hour Measurement	
62.500	15	0
	2000 Hour Measurement	
33.333	15	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Insulation Leakage Group: Life-3

100V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.056	13	2
	168 Hour Measurement	
0.031	11	4
	500 Hour Measurement	
0.100	11	4
	1000 Hour Measurement	
0.139	9	6
	2000 Hour Measurement	
0.357	6	9

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

EMC CAPACITORS - EK200R104K

Parameter: Insulation Leakage Group: Life-3

100V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.435	13	2
	168 Hour Measurement	
125.000	13	2
	500 Hour Measurement	
6.061	13	2
	1000 Hour Measurement	
2.353	12	2
	2000 Hour Measurement	
4.167	12	3

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Insulation Leakage Group: Life-3

100V 85°C

Min (K megohms)	No	Nc
	Initial Measurement	
2.000	12	3
	168 Hour Measurement	
500.000	12	3
	500 Hour Measurement	
166.667	12	3
	1000 Hour Measurement	
666.667	11	3
	2000 Hour Measurement	
19.231	11	4

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter: Insulation Leakage

Group: Life-3
100V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.042	15	0
	168 Hour Measurement	
13.158	13	2
	500 Hour Measurement	
2.632	13	2
	1000 Hour Measurement	
8.621	13	2
	2000 Hour Measurement	
8.197	12	3

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Insulation Leakage Group: Life-3

100V 85°C

Min. (K megohms)	No.	Nc
	Initial Measurement	
15.306	10	5
	168 Hour Measurement	
0.020	9	6
	500 Hour Measurement	
1.531	9	6
	1000 Hour Measurement	
0.625	9	6
	2000 Hour Measurement	
2.083	9	6

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - NC605104RK

Parameter: Insulation Leakage

Group: Life-4

100V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
62.500	11	4
	168 Hour Measurement	
55.556	11	4
	500 Hour Measurement	
45.455	11	4
	1000 Hour Measurement	
66.667	11	4
	2000 Hour Measurement	
20.000	11	4

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Insulation Leakage Group: Life-4

100V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
10.526	13	2
	168 Hour Measurement	
125.000	12	2
	500 Hour Measurement	
55.556	12	3
	1000 Hour Measurement	
270.270	12	3
	2000 Hour Measurement	
200.000	10	5

COMPUTED STAISTIC SHEET

JPL TEST PROCEDURE NUMBER 152. 20-02

GULTON CAPACITORS - CK16M104K

Parameter: Insulation Leakage Group: Life-4

100V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
1.724	14	1
	168 Hour Measurement	
69.444	14	1
	500 Hour Measurement	
86.207	14	1
	1000 Hour Measurement	
17.857	14	1
	2000 Hour Measurement	
13.158	14	1

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Insulation Leakage Group: Life-4

100V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
1.111	12	3
	168 Hour Measurement	
0.067	11	4
	500 Hour Measurement	
0.017	11	4
	1000 Hour Measurement	
2.857	10	5
	2000 Hour Measurement	
3.333	10	5

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152. 20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Insulation Leakage Group: Life-4

100V 125°C

Min. (Kmegohms)	No	Nc
	Initial Measurement	
1.031	15	0
	168 Hour Measurement	
13.514	15	0
	500 Hour Measurmenet	
10.101	14	1
	1000 Hour Measurement	
8.333	14	1
	2000 Hour Measurement	
4.167	13	2

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Insulation Leakage Group: Life-4

100V 125°C

Min. (megohms)	No	Nc
	Initial Measurement	
0.083	11	4
	168 Hour Measurement	
4.545	8	6
	500 Hour Measurement	
21.739	2	13
	1000 Hour Measurement	
	0	15
	2000 Hour Measurement	
	0	15

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152. 20-02

EMC CAPACITORS - EK200R104K

Parameter: Insulation Leakage Group: Life-4

100V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
1.818	11	4
	168 Hour Measurement	
166.667	11	4
	500 Hour Measurement	
133.333	11	4
	1000 Hour Measurement	
476.190	10	5
	2000 Hour Measurement	
142.857	10	5

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Insulation Leakage Group: Life-4

100V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
153.846	14	1
	168 Hour Measurement	
454.545	13	1
	500 Hour Measurement	
277.778	13	1
	1000 Hour Measurement	
156.250	12	1
	2000 Hour Measurement	
17.857	12	3

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
VITRAMON CAPACITORS - VK30BX104K

Parameter: Insulation Leakage Group: Life-4
100V 125°C

Min. (K me gohms)	No	Nc
	Initial Measurement	
0. 333	15	0
	168 Hour Measurement	
5. 882	13	2
	500 Hour Measurement	
2. 273	12	2
	1000 Hour Measurement	
14. 286	12	3
	2000 Hour Measurement	
9. 804	12	3

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
WESTCAP CAPACITORS - B758BX104K

Parameter: Insulation Leakage

Group: Life-4
100V 125°C

Min. (Kmegohms)	No	Nc
	Initial Measurement	
0.031	13	1
	168 Hour Measurement	
9.375	13	2
	500 Hour Measurement	
8.721	13	2
	1000 Hour Measurement	
8.929	13	2
	2000 Hour Measurement	
8.333	13	2

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152. 20-02

AEROVOX CAPACITORS - NC605104RK

Parameter: Insulation Leakage Group: Life-5

200V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
14. 286	14	1
	168 Hour Measurement	
172. 414	14	1
	500 Hour Measurement	
185. 185	14	1
	1000 Hour Measurement	
89. 286	14	1
	2000 Hour Measurement	
73. 529	14	1

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Insulation Leakage Group: Life-5

200V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.444	13	2
	168 Hour Measurement	
1.818	13	2
	500 Hour Measurement	
1.818	13	2
	1000 Hour Measurement	
243.902	10	2
	2000 Hour Measurement	
370.370	9	6

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CK 16M104K

Parameter: Insulation Leakage Group: Life-5
200V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.500	12	3
	168 Hour Measurement	
1.429	11	4
	500 Hour Measurement	
0.806	11	4
	1000 Hour Measurement	
0.056	11	4
	2000 Hour Measurement	
54.348	10	5

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
GULTON CAPACITORS - CN05M105K

Parameter: Insulation Leakage

Group: Life-5
200V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.042	14	1
	168 Hour Measurement	
0.909	11	3
	500 Hour Measurement	
0.033	10	4
	1000 Hour Measurement	
0.015	9	6
	2000 Hour Measurement	
0.233	8	7

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152. 20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Insulation Leakage Group: Life-5

200V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0. 244	15	0
	168 Hour Measurement	
0. 250	15	0
	500 Hour Measurement	
0. 556	15	0
	1000 Hour Measurement	
0. 192	15	0
	2000 Hour Measurement	
1. 786	15	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Insulation Leakage Group: Life-5

200V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.114	15	0
	168 Hour Measurement	
35.714	9	5
	500 Hour Measurement	
18.519	8	7
	1000 Hour Measurement	
18.519	5	10
	2000 Hour Measurement	
11.905	2	13

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152.20-02
EMC CAPACITORS - EK200R104K

Parameter: Insulation Leakage Group: Life-5
500V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.211	15	0
	168 Hour Measurement	
181.818	14	1
	500 Hour Measurement	
111.111	14	1
	1000 Hour Measurement	
152.846	12	1
	2000 Hour Measurement	
142.857	12	3

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Insulation Leakage Group: Life-5

200 V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
52.632	14	1
	168 Hour Measurement	
333.333	14	1
	500 Hour Measurement	
400.000	14	1
	1000 Hour Measurement	
294.118	14	1
	2000 Hour Measurement	
185.185	14	1

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152. 20-02

VITRAMON CAPACITORS - VK30BX104K

Parameter: Insulation Leakage **Group:** Life-5

200V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
1. 250	15	0
	168 Hour Measurement	
2. 083	14	0
	500 Hour Measurement	
2. 381	14	1
	1000 Hour Measurement	
23. 809	13	2
	2000 Hour Measurement	
23. 810	13	2

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152. 20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Insulation Leakage Group: Life-5

200V 85°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0. 030	15	0
	168 Hour Measurement	
3. 261	15	0
	500 Hour Measurement	
2. 778	14	1
	1000 Hour Measurement	
1. 042	14	1
	2000 Hour Measurement	
1. 074	12	3

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

AEROVOX CAPACITORS - NC605104RK

Parameter: Insulation Leakage **Group:** Life-6

200V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.714	14	1
	168 Hour Measurement	
50.000	14	1
	500 Hour Measurement	
41.667	14	1
	1000 Hour Measurement	
41.667	14	1
	2000 Hour Measurement	
20.833	14	1

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
CHEM-ELECTRO RESEARCH CAPACITORS - CK2R104K

Parameter: Insulation Leakage Group: Life-6

200V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
20. 833	13	2
	168 Hour Measurement	
100. 000	12	3
	500 Hour Measurement	
153. 846	12	3
	1000 Hour Measurement	
263. 158	12	3
	2000 Hour Measurement	
250. 000	12	3

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CK16M104K

Parameter: Insulation Leakage Group: Life-6

200V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.610	12	3
	168 Hour Measurement	
66.667	12	3
	500 Hour Measurement	
54.348	12	3
	1000 Hour Measurement	
41.667	12	3
	2000 Hour Measurement	
50.000	12	3

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

GULTON CAPACITORS - CN05M105K

Parameter: Insulation Leakage Group: Life-6

200V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
2.714	10	4
	168 Hour Measurement	
0.042	8	5
	500 Hour Measurement	
0.091	8	7
	1000 Hour Measurement	
1.316	5	10
	2000 Hour Measurement	
0.714	5	10

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152. 20-02

KING ELECTRIC CAPACITORS - CK80BW104K

Parameter: Insulation Leakage **Group:** Life-6

200V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
1. 754	15	0
	168 Hour Measurement	
100. 000	14	0
	500 Hour Measurement	
95. 238	14	1
	1000 Hour Measurement	
35. 714	13	2
	2000 Hour Measurement	
10. 417	13	2

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

SCIONICS CAPACITORS - SCM30D104K

Parameter: Insulation Leakage Group: Life-5

200V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.125	13	1
	168 Hour Measurement	
20.833	13	1
	500 Hour Measurement	
12.281	13	2
	1000 Hour Measurement	
11,905	13	2
	2000 Hour Measurement	
10.000	13	2

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152. 20-02

EMC CAPACITORS - EK200R104K

Parameter: Insulation Leakage Group: Life-6

200V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
11. 111	12	3
	168 Hour Measurement	
142. 857	12	3
	500 Hour Measurement	
114. 286	12	3
	1000 Hour Measurement	
270. 270	10	3
	2000 Hour Measurement	
200. 000	10	5

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

VITRAMON CAPACITORS - VL02BK103K V-LAM

Parameter: Insulation Leakage Group: Life-6

200V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
60.606	11	4
	168 Hour Measurement	
227.273	11	4
	500 Hour Measurement	
120.482	11	4
	1000 Hour Measurement	
227.273	11	4
	2000 Hour Measurement	
208.333	11	4

COMPUTED STATISTIC SHEET
JPL TEST PROCEDURE NUMBER 152. 20-02
VITRAMON CAPACITORS - VK30BX104K

Parameter: Insulation Leakage Group: Life-6
200V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
11. 111	15	0
	168 Hour Measurement	
7. 813	15	0
	500 Hour Measurement	
8. 197	15	0
	1000 Hour Measurement	
8. 197	15	0
	2000 Hour Measurement	
6. 250	15	0

COMPUTED STATISTIC SHEET

JPL TEST PROCEDURE NUMBER 152.20-02

WESTCAP CAPACITORS - B758BX104K

Parameter: Insulation Leakage Group: Life-6

200V 125°C

Min. (K megohms)	No	Nc
	Initial Measurement	
0.054	14	1
	168 Hour Measurement	
1.136	13	2
	500 Hour Measurement	
1.923	12	3
	1000 Hour Measurement	
1.974	12	3
	2000 Hour Measurement	
4.545	12	3

APPENDIX IV

TABULATING CODES AND SERIAL NUMBER CROSS REFERENCE LIST

The reference information listed below is contained in the following pages:

Component Serial Number Cross Reference

Life Test Matrix Group Codes

Manufacturer's Codes

Measurement Number Codes

The cross reference listing is included to indicate the actual tag number used by PTS throughout the contract for individual component control. The corresponding JPL Item Number, together with the Group and Manufacturer Code, indicates the component identification contained in all punched data cards delivered under this contract.

The schedule of Group Codes contained in this Appendix are those which correspond to the Life Test Matrices.

Codes used to identify the manufacturers are identical with those contained in the punched data cards except the "0" code for Aerovox, which was changed to"010" in the punched cards.

Measurement Codes are shown as a two-digit number. The first digit designates the environmental series ("1") or the the life test series ("2"). The second digit designates the sequence of measurements within each series.

Item No.	Group No.	Mfg.	Serial No.
1	1	0	A 6 8 0 0 2
2	1	0	A 6 8 0 0 3
3	1	0	A 6 8 0 0 4
4	1	0	A 6 8 0 0 5
5	1	0	A 6 8 0 0 6
6	1	0	A 6 8 0 0 7
7	1	0	A 6 8 0 0 8
8	1	0	A 6 8 0 0 9
9	1	0	A 6 8 0 1 0
10	1	0	A 6 8 0 1 1
11	1	0	A 6 8 0 1 2
12	1	0	A 6 8 0 1 3
13	1	0	A 6 8 0 1 4
14	1	0	A 6 8 0 1 5
15	1	0	A 6 8 0 1 6
16	1	0	A 6 8 0 1 7
17	1	0	A 6 8 0 1 8
18	1	0	A 6 8 0 1 9
19	1	0	A 6 8 0 2 0
20	1	0	A 6 8 0 2 1
21	1	0	A 6 8 0 2 2
22	1	0	A 6 8 0 2 3
23	1	0	A 6 8 0 2 4
24	1	0	A 6 8 0 2 5
25	1	0	A 6 8 0 2 6
26	3	0	A 6 8 0 2 7
27	3	0	A 6 8 0 2 8
28	3	0	A 6 8 0 2 9
29	3	0	A 6 8 0 3 0
30	3	0	A 6 8 0 3 1
31	5	0	A 6 8 0 3 2
32	5	0	A 6 8 0 3 3
33	5	0	A 6 8 0 3 4
34	5	0	A 6 8 0 3 5
35	5	0	A 6 8 0 3 6
36	2	0	A 6 8 0 3 7
37	2	0	A 6 8 0 3 8
38	2	0	A 6 8 0 3 9
39	2	0	A 6 8 0 4 0
40	2	0	A 6 8 0 4 1
41	4	0	A 6 8 0 4 2
42	4	0	A 6 8 0 4 3
43	4	0	A 6 8 0 4 4
44	4	0	A 6 8 0 4 5
45	4	0	A 6 8 0 4 6
46	6	0	A 6 8 0 4 7
47	6	0	A 6 8 0 4 8
48	6	0	A 6 8 0 4 9

49	6	0	A68050
50	6	0	A68051
51	1	0	A68052
52	1	0	A68053
53	1	0	A68054
54	1	0	A68055
55	1	0	A68056
56	1	0	A68057
57	1	0	A68058
58	1	0	A68059
59	1	0	A68060
60	1	0	A68061
61	1	0	A68062
62	1	0	A68063
63	1	0	A68064
64	1	0	A68065
65	1	0	A68066
66	1	0	A68067
67	1	0	A68068
68	1	0	A68069
69	1	0	A68070
70	1	0	A68071
71	1	0	A68072
72	1	0	A68073
73	1	0	A68074
74	1	0	A68075
75	1	0	A68076
76	3	0	A68077
77	3	0	A68078
78	3	0	A68079
79	3	0	A68080
80	3	0	A68081
81	5	0	A68082
82	5	0	A68083
83	5	0	A68084
84	5	0	A68085
85	5	0	A68086
86	2	0	A68087
87	2	0	A68088
88	2	0	A68089
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LIFE TEST MATRIX GROUP CODES

Code Number	Voltage	Temperature ^{o}C
1	50	85
2	50	125
3	100	85
4	100	125
5	200	85
6	200	125

MANUFACTURER'S CODES

Code Number	Manufacturer	Part Number
0	Aerovox	MC605140RK
1	Chem-Electro Research	CK2R104K
2	Gulton	CK16M104K
3	Gulton	CN05M105K
4	King Electronics	KC80BW104K
5	Scionics	SCM30D104K
6	EMC	EK200R104K
7	Vitramon	VL02BK103K V-LAM
8	Vitramon	VK30BX104K
9	Westcap	B758BX104K

MEASUREMENT CODES

Code Number	Measurement
11	Initial
12	Post Burn-in
13	Post Vibration
14	Post Mechanical Shock
15	Post Thermal Shock
16	Post Moisture Resistance Test
21	168 Hour Life Test
22	500 Hour Life Test
23	1000 Hour Life Test
24	2000 Hour Life Test